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EDITORIAL.

THERAPEUTICS IN THE SEVENTEENTH CENTURY.

Those among us who are dissatisfied with the therapeutics of to-day, should not fail to read Dr. Raymond Crawfurd's volume on "The Last Days of Charles II.",* for though we are wont to visit drastic criticism upon what is done at present in the way of the administration of drugs, our attack of ill-temper will be short-lived when comparisons are made with what was deemed necessary in the treatment of disease in the seventeenth century. That the art of correct diagnosis at this time was still an undeveloped part of medical science should make for no surprise, since even at a later day immaturity stamped this most important matter with many demerit marks declarative of ignorance; but what should fill us with surprise is the lengths to which human ingenuity of the medical sort went, when the question arose just what drugs to prescribe to alleviate suffering. Whether or not Charles II.'s death was due to apoplexy or poisoning or chronic granular kidney with uremic convulsions, as vouched for by Dr. Crawfurd, has small concern for us at the present day, since it is a purely controversial matter with but few gleams of ultimate solution; nevertheless, in remembering that the King's various doctors were at sea as regards the nature of the disease, a touch of modernity is given the case by virtue of the fact that floundering at so momentous a time is always attended by the invocation of altogether too many drugs, in the hope that their successive application will demonstrate that there really must be one drug in the vast arsenal of therapeutics which can demonstrate the correctness of clever guessing.

It requires no intolerable stretch of the medical imagination to put the clock back some two hundred years and act as witness to the scene which started with the use of the lancet on "a vein in the right arm" from which "sixteen ounces of blood were removed" by Sir Edmund King, who "blooded the King." This gentle expression of the art of

*New York: Oxford University Press.

medicine was followed at short intervals by "cupping glasses * * * applied to his shoulders forthwith, and deep scarification * * * by which they succeeded in removing another eight ounces of blood. A strong antimonial emetic was administered, but as the King could be got to swallow only a small portion of it, they determined to render assurance doubly sure by a full dose of Sulphate of Zinc. Strong purgatives were given, and supplemented by a succession of clysters. The hair was shorn close and pungent blistering agents applied all over his head; and as though this were not enough, the red-hot cautery was requisitioned as well. So severe were the convulsions that the physicians at first despaired of his life, but in some two hours consciousness was completely restored."

Here it would be advisable for the interested reader to take breath, for though the convulsions stopped and the royal patient was "in a pretty good state," which Chesterfield in a letter to Ormond "ascribes to the joint agency of the medical remedies and the blessing of God, so that the physicians were able to pronounce him out of danger for the present," there was to be only a short-lived surcease of suffering both from within and without, for when the King's physicians reassembled at the bedside "in the evening of Monday," the consultation was held "with a view to relieving the pressure of 'the humors' on his brain by administering remedies to promote sneezing, along with additional aperients. Noxious plasters were applied to the soles of his feet. A preparation of cowslip flowers and spirit of Sal Ammoniac was designed to stimulate and to strengthen the brain by the combined action of the remedies. Soothing draughts were prescribed to allay thirst and to stave off the scalding of the urine, which they were aware must inevitably result from the freedom with which they had made use of the blistering properties of Cantharides. Nourishment was ordered in the form of light broth and of ale made without hops; and with this, therapeutic creativeness rested from its labours on the first day." But Sir Charles Scarburgh, who was first physician to King Charles II. and who is responsible for this detailed account, surely put too high a value on "therapeutic creativeness", since Tuesday, and all the succeeding days until "shortly before noon on Friday the sixth of February [when] he expired calmly without any return of convulsions" were in fact many anxious hours that demanded greater and greater "therapeutic creativeness," an insatiability that was fortunately met with the remedial treasures in the armamentarium of drugs at the beck and call of the King's physicians. An organism that was able partially to hold its own against the inroads effected by the administration of Raleigh's Antidote, consisting of a multitude of ingredients, powdered Goa stone, Peruvian

Bark in greater quantity, Sal Ammoniac with greater frequency, the Oriental Bezoar stone which "was transferred from its normal habitat in the stomach of an eastern goat to its last resting-place in that of the King," and julep of Black Cherry Water "at the same time [that] his jugular veins were mulcted in a further ten ounces of blood," is entitled to the greatest consideration; for though our democratic ideals may be in complete opposition to those entertained by all royalists for kingly worth and kingly grandeur, we must admit that here was one, who though frail as morals go, had a physique that would have called forth adulatory praise from any modern physical educator of socialistic proclivities.

Dr. Crawfurd contends with heat that Sir Charles Scarburgh with his idea of "convulsions" and Dr. James Welwood, with his conflicting ideas of either "apoplexy" or "poison," were really very poor diagnosticians, and that "Charles II. [who] was licentious in his practice * * * but knew his people, and rewarded merit," as the Johnsonian phrase runs, was the victim of "chronic granular kidney (a form of Bright's disease) with uremic convulsions, a disease that claims the highest proportion of its victims during the fifth and sixth decades of life." Although we do not wish to impugn the author's historical thoroughness in arriving at his scientific conclusion, we cannot help being more fascinated and more enthralled by a lay diagnosis and prognosis which certainly fits in more closely with the spirit of the times as made clear to us after reading a number of Memoirs. On the Sunday evening preceding the fatal Monday, the pure-hearted Evelyn wrote as follows: "I can never forget the inexpressible luxury and profaneness, gaming and all manner of dissoluteness, and as it were total forgetfulness of God (it being Sunday evening) which this day se'nnight I was witness of, the King sitting and toying with his concubines, Portsmouth, Cleveland, and Mazarin, etc., a French boy singing love songs, in that glorious gallery, whilst about 20 of the great courtiers and other dissolute persons were at Basset round a large table, a bank of at least 2000 in gold before them, upon which two gentlemen who were with me made reflections with astonishment. Six days after all was in the dust."

Here is summed up all the philosophy of life as conceived by the admonitors of the seventeenth century, and since, at this time, medical science was at a disgracefully low ebb, why cudgel our brains to ascertain the real cause for the demise of a gay and festive Stuart? A "forgetfulness of God" may or may not be followed by a stricken condition, but this we can say in all certainty, that a resort to the belief that Divine wrath has been incurred is quite a help to all physicians of ancient and modern times, when the rudder that is to waft them to the haven of

medical security is lost, and an explanation is demanded why Goa stone or the Oriental Bezoar stone or something just as visionary was prescribed instead of a simpler remedy.

WHAT SHOULD DOCTORS READ?

Vigor of thought, which a kindly public is ever willing to associate with the mental status of the philosopher of the sickroom, is really a more important asset than the rank and file in the medical profession think it to be, when appraising the qualities necessary to success in combating the obstacles, which naturally arise at all bedsides to thwart quickness and force of mind on the part of the medical practitioner. An extensive knowledge of medical literature, never detrimental to a combination of deep thinking and good reasoning, is often to be deprecated on the grounds, that its varied and manifold skeins are capable of yielding to the ratiocinative medical man only a confused picture of what should be as clear-cut as if etched with acid. Hence the concentrative force, without which the desired goal cannot be reached, is lacking, and instead there is so great an interplay of real and fanciful theories, that the negligible coloring given forth by the patient effects what it should never do—namely, a partial subversion of the right theory as tentatively expressed by one's inner consciousness backed by scientific training. And just because evidences of this sort of weakening are only too often the outcome of the workings of a mind steeped in no other lore than that of medicine, the thought should present itself to the critics of to-day, that where excess of knowledge of a subject has this handicap, measures should be taken to encourage the medical entity to wander in other intellectual fields, so that stanchness in mental attitudes may be achieved.

By what means then is that strength to be acquired which shall have for its high purport, clarification of thought and single-mindedness incapable of procrastination? Quite recently, Dr. Eliot has given vent to his pent-up literary feelings in the announcement as to what books he deems of vast importance to the furthering of expansion, on the part of those individuals, whose vocations or avocations have deprived them of enough judgment to make their own selection. A sledge-hammer application to the benumbed sensibilities of a people that is prone to read merely to while away an idle hour with no thought of future gain, has the virtue of inciting the thinking faculties in the right direction; but while the jolt is productive of a limited illumination, we doubt if advice, such as is embodied in this latest five feet of culture, has enough significance for the average man to make it the worthy disturbing

factor its originator intended. To promulgate a course in reading for the better sort of minds, irrespective of what their predilections may be, or what ballast is really needed to bring about the much desired sanity that shall be destructive of crotchets and whimsies, and thus abet the only philosophic thought that counts for much, is taking unto oneself a narrow and egoistic survey of the defective training of numbers of men, and, moreover, can never achieve the happy result of giving to any one individual exactly what he lacks, despite his eagerness to fill up undesirable lacunæ by imitation.

This once understood, we need not hesitate any longer to consider just what doctors should read to enforce the cautiousness and logicality of their brains. While our modesty will not permit us to suggest the reading of this or that book, the situation is not so difficult of solution as would at first appear. To insist upon another reading the book which of all books has been the best nutriment in circumstances peculiar, at the time, to a certain individual, is somewhat in line with Dr. Eliot's ideas, and should by no manner of means be encouraged; but though the objections to this sort of procedure are many and formidable, there is yet to be considered what a scientific profession, such as the medical, should read, to bring its various members in juxtaposition with all the small and large problems which encompass every medical case. Pure medical science undefiled by readings in other fields, yields but small knowledge of the intricacies of human nature; and though it might so happen that occasionally a medical man intuitively understands the salient features of the sickroom, so that by weighing them for or against his theory of what really obtains in a medical sense, he either accepts or discards them, thereby acquiring the stanchness and tenacity of his own opinion, the instances are too rare to arrest attention. Realizing that it is only at rare intervals that this knowledge is ours, without arduous delving into what might be called the philosophy of life, the idea becomes paramount that to effect a complete strengthening of a mind, inured only to the teachings of medical science, a wider knowledge of the various significances of the manifold phases of modern civilization is necessary.

All of us have repeatedly been told by many educators of light and leading, that the reading of novels is a sheer waste of time. Not only have the men in the advance-guard of education's triumphal march proclaimed against them, but even medical men, who have commanded our attention on account of their rather unusual qualities as exponents of the medical art, have decried the slightest indulgence in this pastime. To live in a fantastic world continually, must mean a weakening of the mental poise; but an occasional excursion, especially into those fictional realms, that have real individuals and not types, is not only refresh-

ing but an intellectual tonic, the importance of whose virtues is not at once grasped. But this plea for the limited reading of novels that have the means of bringing before us excellent counterfeits of the individuals which the general practitioner encounters in the sickroom, is not given so as to convert those who are violently opposed to this intellectual exercise to our lowly way of thinking, but rather as a suggestion that, even out of what superior persons consider unmitigated alloy, some good may be got. And here it would be well to say that no book, be it good or bad, as judged in the fierce light of criticism, has the same effect on various individuals. One man may derive great and lasting benefit from a work that leaves another unmoved, and the simplest sermon may have the necessary vividness to engraft a new line of reasoning that may be a help to the medical man throughout his whole career. An intellectual crisis is all that is necessary, and to say that it can only arise from a deeply philosophical work is a statement that is purely visionary. No profit to any reader has ever come from enforced reading, and only suggestion, graciously applied, can hope for some measure of success. The five feet of culture, as advocated by Dr. Eliot, and the hundred best books, as given to a weary world some decades back by Sir John Lubbock, have the same futility, since their assiduous reading can only produce the artificial intellectuality that does not make for mental clearness or the incisiveness of thought, which carries the medical man, deeply read in other walks besides that of medicine, beyond the ken of those groundlings, whose mental processes are but an exaggerated imitation of what they foolishly conceive to be the scientific phrasing of some medical luminary whose many theories swamped the only prop that counts for aught in the sickroom—force of mind and clarity of thought.

OLIVER WENDELL HOLMES.

There have been greater literary figures and greater doctors among the Americans than the kindly philosopher of the "Breakfast-Table," but none has ever had the same sort of charm, the same fascination for him who prefers gentility in literature to blatancy. There also have been many centenaries this year, hundredth anniversaries in celebration of the birth of distinguished men, but what appeals have they made to all, alongside the celebration of Oliver Wendell Holmes's birthday? A hundred years is quite a span of time to look back to, and though few of us can say in the much criticized manner of very old men "that we well remember when his first poems appeared and his first essays were pub-

lished" there are yet many not past the meridian of life who can assert in all truth, that they do remember when and how, in their intellectual beginnings, their pulses beat faster because of the presence of the literary force which permeated American literature on account of the strong individuality of Oliver Wendell Holmes. Remembrances such as these count for much; they never lose their lustre; they are the tonic we need to-day since strenuousness and seriousness have almost vanquished what is witty and charming.

As attentive readers of the currents which guide medical thought, it behooves us to pay less attention to the literary Holmes than to the other half of his personality—namely, the medical. But though partly inclined to dismiss his more important vocation with a few words, we yet feel that what we are about to say about his medical career—his excellence as a lecturer on anatomy, his epoch-making contribution on "The Contagiousness of Puerperal Fever"—will have all the drawbacks of a twice-told tale, so often have these details been mentioned in medical journals. His lectureship, covering many years of arduous labor, makes for much as an indication of what a man, gifted in other and altogether different lines, is capable of doing, when a duty lies before him that cannot be shirked. Duty it must have been that held him fast to his chair as professor of anatomy,—the high sense of duty that only a brain steeped in Puritanism can produce. And because he met its stern behests in a philosophic mood, when more gracious things of irresistible allurements were beckoning to him, the best laurel that the medical mind can conceive should be his to hold forever!

In looking back on the early years of one, who engaged in the double struggle of making both medicine and literature yield a slight emolument, we should not forget that though both are about the severest taskmasters there are, the drudgeries of medicine far exceed those of literature. This statement is founded in fact, and need not be taken as a scathing criticism of a branch of science that requires greater patience, greater fortitude and greater forbearance, than any other life-work; and where the artistic temperament is paramount, as it was in the case of Oliver Wendell Holmes, a ready appreciation should be ours of how its burdens are many times increased. No wonder then that shortly after his return from Europe, he quit the rough and narrow path of general practice, and accepted the Parkman Professorship of Anatomy and Physiology in the Harvard Medical School. No doubt this was done after careful deliberation and many depressions, lest the step might prove fatal to success garnered in this new field of activity; but we, who look at things in the calm light of retrospection, are not loth to admit at once, that no step he could have taken would have been fraught with

greater importance to the temperament of which he gave such delightful illustrations later on. By lecturing on a subject that was not a task, but the one predilection, in a medical sense, which throughout his life engaged a large share of his best thought, he got nearer the phase of humankind that was best liked by him—the instructors in various departments and, above all, the students. The best essays in his "Autocrat of the Breakfast-Table" and "The Professor of the Breakfast-Table" would not have those outstanding qualities of reality and of truth to human nature, had he stubbornly clung to the humdrumness of the general practitioner's life, as we take it to have been even in Boston in the prosaic year of 1836!

That a many-sided man such as Holmes was—was he not lecturer on anatomy, author of medical essays that have a literary flavor rarely equalled by other writers, poet, essayist and far-famed raconteur?—should have failed as a novelist, ought not to fill us with surprise. Few, if any medical men, have written fictional works that bear comparison with the best, and this can readily be understood when one remembers, that nothing is so fatal to the imagination as continuous serious thought that is constantly shot with questionings relative to many of the problems of the time. We often hear the charge brought against Holmes, that the originality necessary to the writing of an imaginative work was lacking in him; hence he turned to the writing of that which required less of a natural gift, and more of the talent that has strength because it is imitative. Nothing could be further from the truth.

Even though we may trace at times some resemblance in his essays to the best characteristics of Lamb and Thackeray—Lamb's wit and charm and Thackeray's not ungentle irony—his attitude to his subjects was undeniably his own; for the reason, that his strong personality was so thoroughly imbued with what is best in Puritanism, that he regarded all things from a corner of life unthought of before. This may or may not be originality, but it is so near that desired goal that it must strike even the biased as being almost akin to it. His coevals—Lowell, Motley, Hawthorne, to mention only a few—were more reflective, in their writings, of tried and honored influences and standards; and while their literary values are just as high as his, and at times even higher, individuality is not the force that is paramount. And since to-day individuality counts for much in the practice of medicine, does it not devolve on us to regard Oliver Wendell Holmes as the protagonist, who really got out of the science of medicine the virile lesson of the great advantages of this force?

LITERARY NOTES.

In a lecture delivered to the Red Cross Society, and published in a recent number of the *Normandie Médicale*, Dr. Raoult recalls the fact that even as far back as ancient times the contagiousness of tuberculosis was recognized. In 1751 Philip V. of Spain passed an ordinance to prevent all dangers from contagion, thus showing that it was in the south of Europe the first steps were taken to abate the spread of the disease. In fact, northern Europe lagged many years behind, and even in the first half of the nineteenth century there still were indications that little, if anything, in this direction had been done. Chateaubriand, writing from Rome to Fontanes, in the early years of the last century, says: "I am in great financial straits. I had hoped to realize six thousand francs on the sale of my carriages. But the law that already obtained with the Goths, is enforced at Rome—namely, tuberculosis is declared a contagious disease, and just because Mme. de Beaumont, who is tuberculous, has driven two or three times in my carriages, nobody is willing to buy them." George Sand, who accompanied Chopin on his travels when he was in search of a climate that would benefit his tuberculous condition, was greatly inconvenienced by the stringent laws of Majorca, and fared even worse at Barcelona, where the molestation was excessive. Her complaint of the conditions encountered runs as follows: "Here I am in France again, after a journey that was about the most unfortunate attempt at traveling I have ever undertaken. After hundreds of inconveniences were heaped on us, we hoped to establish ourselves in Majorca, a country greatly to our liking, but about the most inhospitable that one can imagine. At the end of the first month of our sojourn, Chopin became so desperately ill that the necessity arose to call in one, two and even three doctors; one proved as asinine as the other, for they at once spread the report throughout the island that the new-comer was tuberculous in the last degree. After this, there was consternation on the part of the inhabitants. Tuberculosis is a disease quite uncommon in this climate and is considered contagious beyond a doubt. The owner of the little house we had rented did not hesitate to turn us out of doors, and declared he would bring suit against us, so as to compel us to re-paint the entire house because of the infection. We then installed ourselves in the Valdemosa monastery, but no domestics could be got, as they absolutely refused to wait on any one affected with tuberculosis. The humidity of the monastery was so great that we resolved to leave at any price, though Chopin was in no condition to be moved. We asked only that one wish be gratified—the hire of a carriage to take us to Palma, whence we intended to embark. This was refused us, although all our friends had carriages and wealth in keeping with their station in life. After trying in vain to get what we wanted, necessity compelled us to resort to a brouette (a small two-wheeled carriage) in which we covered seven and a half miles along unbeaten paths. Arriving at Palma, Chopin had an excessive hemorrhage. The next day we embarked on the only steamboat that belonged to the island and which was used to transport hogs to Barcelona; there was no other way of quitting this accursed country. When we were about to leave the tavern in

Barcelona, the proprietor insisted on our paying for the bed in which Chopin had slept, because it was infected and the police would compel him to burn it."

Dr. Gaudichard, in a recent number of the *Répertoire de pharmacie,* comments on the knowledge of the ancients as regards opotherapy and its various ways of utilization. Thus in the early centuries we find that the products derived from the animal kingdom were in the shape of powders. This primitive notion was necessitated on account of the rudimentary state of all tools at this epoch. Preference was controlled by circumstances. In the fifth century, Sextus Placitus Papyriensis advocated the use of the animal vulva, desiccated and pulverized. In the sixteenth century various parts of animals were first roasted, then burnt, after which pulverization was easily effected. At this period thought was also given to the conservation of organic products by sprinkling them with yellow sandalwood, or surrounding them with wormwood. The animal powders were even combined with other remedies. Baudon, in his pharmacopeia, writes as follows "The electuary of lungs is prepared by mixing sugar with equal parts of the lung of the fox, liquorice juice, maidenhair, fennel- and anise-seeds." And in the seventeenth century, Van Helmont placed desiccated blood above all other preparations. Organic extracts, though not called by this name, were utilized in ancient times. In the beginning of the Christian era (about 65 A. D.) Dioscorides of Anazarba, a Greek physician, who had gained renown by a treatise on materia medica, wrote to this effect: "The liver of the hedgehog, dried in the sun in a pot exposed to the full rays of sunshine, taken with honey, benefits and cures diseases of the kidneys and dropsy." A bouillon prepared after a fox's lung had been desiccated was considered an excellent draught in all cases of difficult breathing. Pliny prescribed hogs' testicles, macerated in milk, in epilepsy. In the centuries which followed, macerated testicles did not lack in popularity. Joseph du Chesne's favorite prescription as an aid to conception was rams' testicles soaked in wine and then dried. Afterwards they were pounded, macerated and boiled over a slow fire in two litres of malmsey, a wine of Napoli di Malvasia. Here is surely an extract that can well hold its own among all extracts!

Syrups containing extracts from animal organs were not ignored by the ancients. The archives devoted to opotherapy abound with enough instances to show that these preparations were held in high esteem in the earliest centuries. Dioscorides, in his "Materia Medica," recommends for a cough the daily use of an electuary composed of the lung and palate of the deer, dried on a dung-hill and then thoroughly beaten up with honey. Pliny is of opinion that the best remedy for hemoptysis is a pâté of snails, a preparation not unknown to our modern pharmacopeia. Incontinence of urine was combated by the administering of macerated bladders mixed with salt or honey, so that absorption might the more readily be effected. In splenic affections, John of Cuba, prescribed beef spleen mixed with honey. And finally, Dusseau hit upon what he thought was a great discovery when he evolved his powerful aphrodisiac, consisting of birds' brains, to which were added the yolks of eggs and honey!

ORIGINAL ARTICLES.

THE TOXÆMIA OF PREGNANCY.

By Herbert Marion Stowe, M. D., of Chicago. Ill.
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It is a well-known fact that pregnancy entails upon every woman a certain degree of toxæmia. The changes produced in the maternal organism incident to the development of a new being are intimately associated with a disturbance of the normal functions of the organs of metabolism and elimination. Not only do the needs of the maternal system require attention during gestation, but it is necessary to provide for the nourishment of the fetus and the disposition of its excreta. This double duty imposed upon unaccustomed and oftentimes diseased organs constitutes the physical basis of the toxæmia of pregnancy.

The etiology of obstetric toxæmia is obscure. When occurring during the early months of pregnancy, investigations have been directed to perversions of the alimentary tract and its associated glands, the kidneys and the thyroid and parathyroid bodies; during the terminal months, the fetus and its envelopes have been studied by observers as a possible source of the toxins but, as yet, no reliable findings have been adduced. Undoubtedly, perverted metabolism plays an important role in toxæmia, but the incompleteness of our present knowledge of the various processes involved makes a problem of the most complex nature.

The most acceptable theory offered in recent years is that of Folin. According to this author, physical energy is derived from oxidation of the carbohydrates and the nitrogenous portion of the proteid molecules. The major portion of the proteid is split up into a non-nitrogenous element which supplies energy to the system and a nitrogenous moiety which is finally converted into urea. This latter portion is not built up into the tissues of the body, but passes out through the excreta. The amount of urea and total nitrogen which appear in the urine are, therefore, entirely dependant upon the diet. The non-nitrogenous element is used to repair the waste occurring in the vital organs and its end product is kreatinin. This material is practically constant in the urine and is independant of the diet. The proteid molecule undergoes digestive action in the alimentary canal as far as albumose. Albumose is then hydrolized into

amino acids when the ammonia groups are split off and pass into the portal blood to the liver to be changed into urea. Practically all the nitrogen passes into the liver as ammonia salts. It is stated on good authority that this transformation occurs solely in the liver. From experiments on the lower animals, in whom Eck's fistula has been established, it has been determined that the alimentary canal is the most fruitful source of ammonia and that its formation depends upon the proteid diet, but is unaffected when the diet is proteid free. If, for any reason, the liver cells fail to synthesize the ammonia into urea, the urea content of the urine is reduced, while the nitrogen excreted as ammonia is markedly increased. On the other hand, if the ammonia is combined in the alimentary canal with free organic acids as a base, the quantity of urea is lessened from a lack of ammonia. The condition of acid intoxication may influence the process to a certain extent and some cases of toxæmia may be benefited by the administration of sodium bicarbonate which takes the place of ammonia as a base and allows the ammonia to pass over to the liver. In a large number of cases, however, no beneficial results are obtained. The two arguments against this theory are first, that the symptoms remain stationary while the evidence of acid intoxication is removed and, secondly, clinical evidence may be present for a long time without producing symptoms of toxæmia.

Quincke has justly stated that the liver is the central organ of metabolism. While other tissues may be involved to a certain extent, the serious forms of toxæmia are nearly always accompanied by profound pathological changes in the liver cells and parenchyma. Whether these changes are primary or secondary to the general metabolic disturbance is difficult to state at the present time. In the fatal cases that occur in early pregnancy, a great variety of pathology may be found. The liver may be normal, slightly increased or markedly reduced in size. In the milder forms a diffuse granular and fatty degeneration is found. Hemorrhage is rare. In pernicious vomiting, we find, in addition, an area of necrosis in the central portion of the cell extending more or less toward the periphery. This latter part is granular. The intralobular tissues are normal in appearance. In acute yellow atrophy, the necrosis is extreme and may interrupt the hepatic function completely. The cause of such rapid destruction of the liver parenchyma is some excessively irritant ferment, and is ascribed by Ewing and Wolf to the presence of extravasated bile.

These early toxæmic cases are characterized clinically by vomiting, rapid pulse, various nervous disturbances and decided weakness. Pruritis, salivation and neuralgias are common. Jaundice is the exception. The urinary findings are low urea, high undetermined nitrogen, high ammonia excretion and indicanuria. Albumin may be absent or present in small amount. The presence of albumin in the urine at this time does not invariably denote disease of the kidney tissues. The failure of the liver to synthesize the irritant toxins derived from both maternal

and fetal sources results in irritation of the healthy kidneys during the process of elimination and albumin is found in the urine. When the liver action has been restored, the toxins are neutralized, albumin disappears from the urine and the kidneys, if not too greatly damaged, recover in a short time. This type should be called hepatic albuminuria.

If the theory of Folin is true, it should be possible to estimate the degree of destruction of liver tissue by an analysis of the urine. Normally, the amount of nitrogen excreted as ammonia is five per cent. Williams claims that when this percentage is under ten, the patient is not toxæmic except in a mild degree. If the percentage rises over ten, not only is the cause toxæmic, but the pregnancy should be at once terminated.

It is to be remembered, however, that many of these patients are starving individuals, living upon a low and nearly proteid-free diet, and much of the nitrogen found in the urine is not the result of faulty liver action, but is derived from combustion of the tissues of the body. In starving adults, in phlethoric individuals and in the cyclic vomiting of children, this high percentage of ammonium nitrogen may be found in the urine wholly independent of toxæmia. Cases of high ammonia percentages are being reported where a non-operative treatment was carried out, and the patients recovered. On the other hand, the writer has been compelled to terminate gestation in several instances because of threatening clinical symptoms when the nitrogen percentage was below ten.

One of the greatest drawbacks in the estimation of nitrogen ammonia is the difficulty of the technique employed. Folin's method is accurate but is too complicated for the general practitioner and necessitates the assistance of a chemist. It requires several hours for the complete test. Furthermore, many such tests may be necessary in a single case as the findings are apt to vary day by day. The amount and kind of diet should be studied in connection with the result obtained by the test.

In lieu of more definite information on the subject, we may state that the estimation of nitrogen excreted as ammonia as determined by Folin's or Kjeldahl's technique is the most accure method of determining the presence and degree of toxæmia of pregnancy at the present day. By this test we may correctly estimate the importance of otherwise trifling signs and gauge the proper time to dispense with medical treatment and resort to surgical interference. The test is not always accurate, however, and the findings should be studied in connection with the clinical evidence in order to indicate the proper treatment.

All patients in the early months of pregnancy who are suffering clinically from toxæmia and whose nitrogen ammonia is relatively high, should be placed at rest in bed upon a milk diet for a period of seven to ten days. During this time, special attention is to be paid to securing free action of the bowels, kidneys and skin. If the condition does not

improve, if the nitrogen ammonia tends to increase, if emaciation progresses, the uterus is to be emptied without further delay.

If albumin and casts are present in the urine in association with the above findings, it is preferable to induce abortion rather early than to place much confidence in the efficacy of medical treatment. These cases are disposed to cause trouble later on in pregnancy.

The principal form of toxæmia developing during the later months of gestation is eclampsia. Whether this form constitutes a distinct entity apart from that of the pernicious vomiting is a disputed question. Arguments pro and con have been raised. Williams believes that the two diseases are distinct in all their phases, while others hold that they differ only in degree. It is a noteworthy fact that former attacks of pernicious vomiting predispose to eclampsia, and that nephritic lesions combined with poor elimination of the body toxins are commonly associated with this "disease of many theories."

Again, in the hepatic form, the liver is the chief organ involved. The first changes occur in the liver cells, the endothelium of the capillaries and the peripheral portions of the lobule. As eclampsia develops, these cells assume a reticulated and vacuolated appearance. The interlobular vessels soon become thrombosed. A constant factor is the congestion and dilatation of the capillaries in the peripheral portion of the lobule. Because of poor circulation, and the increase of fibrin in the blood, focal necroses appear and subcapsular hemorrhages are commonly found. In advanced cases the picture is similar to that of acute yellow atrophy. Schmorl was enabled to recognize these findings in the great majority of his autopsies and considers them pathognomonic of the condition.

In the nephritic form of eclampsia, the kidneys bear the brunt of the battle. These organs show changes varying from congestion to severe nephritis. Schmorl was able to find but one healthy kidney in 73 examined. Thrombosis of the smaller vessels was commonly observed. If pregnancy develops during the course of a chronic nephritis, the occurrence of eclampsia is favored.

Other changes frequently found in the eclamptic autopsy were emboli of decidual, syncytial and fat cells in the lungs, fatty degeneration and thrombosis of the vessels of the heart and thromboses and hemorrhages in the brain. Briefly, eclampsia is characterized by multiple thrombi, hemorrhages and necroses in the various organs, an increase of fibrin in the blood and a relatively high toxicity of the body fluids.

Many experiments have been made to determine the toxicity of the various fetal appendages. The placenta has been a popular object of study. Schmorl found that placental cells were carried by the maternal blood to distant portions of the body, but later observations have shown that this may occur in the absence of eclampsia. Veit states that the entrance of placental cells into the circulation produces a poison that acted as the direct cause of the convulsions. Ascoli went further and claimed that a new substance—lysin—was formed which dissolved and

neutralized the action of the cells. If a great deportation of cells takes place, an excessive quantity of lysins is formed and eclampsia results. Dienst has recently claimed that an increased number of leucocytes is formed during gestation. These cells are destroyed in the placenta and a ferment is liberated that causes the convulsions. He believes that the impending storm can be foretold by a blood examination during the later weeks of pregnancy.

The Italian writers have studied the thyroid and parathyroid bodies. The internal secretion from these organs has a certain influence upon the pregnant woman. These authors believe that the auto-intoxication which fulminates in an attack is due to a deficiency of these secretions, and that they act as an antodote to certain excretive products given back by the fetus to the mother. Both glands have been extirpated from pregnant animals and they have died in convulsions. Autopsy revealed the conditions peculiar to eclampsia. Eclamptic women have been treated with the extract and have recovered in some cases. Further work is necessary to substantiate this theory.

Efforts have been made to inject an extract of the placenta from an eclamptic woman into the lower animals. These animals have frequently died in spasms, but the value of the tests have been overdrawn. As pointed out by Lichtenstein, these fatal effects are due to the injection of animal tissue, decidual and other cells and organic debris. If all animal tissue has been filtered prior to the injection, the animals seldom die. The results are only toxic phenomena common to all intoxications from animal albumin.

Eclampsia is still the disease of theories and we have, as yet, reached no positive conclusions.

Considerable attention has been directed to what is termed the eclamptic state—a condition very similar to eclampsia, but without convulsions. Such cases have been reported by Schmorl, Reinecke, Liepmann, Esch and others. The toxins of eclampsia do not always have the same action on the central nervous system. They consist of a convulsive toxin and a general poison. If the latter is in abundance, a paralysis of the nervous system sets in, similar to that produced by the ingestion of certain known poisons, marked changes occur in the vital organs and death results without convulsions. If the former predominates, the clinical picture is that of convulsions.

The cases of prodromal eclampsia seem to show that convulsions are not absolutely included in the clinical picture, a statement which many authorities will not accept. Nevertheless, this condition is serious and warns the medical attendant to be on his guard in treating this condition effectually in the early stages. While there are exceptions, the great majority of cases of eclampsia with convulsions give a definite warning of the impending attack that may continue for several weeks prior to the seizure. A pulse of high tension, disturbance of vision, headaches, neuralgias and the changes in the urine are characteristic. The people are

more and more recognizing the necessity of coming under medical care early in pregnancy and consequently, many of these cases can be avoided. It is unwise to place too much confidence upon the urinary findings in the so-called hepatic eclampsia as the urine may be practically normal.

While we are uncertain as to the cause of eclampsia, we have made progress in the treatment of the disease. In a given eclamptic woman with convulsions, we believe that a progressive injury to the vital organs is taking place. If the injury inflicted before delivery is mortal, the patient will die in spite of any treatment whatever. If the injury is not mortal, the best means of saving the mother is by a rapid delivery of the child and placenta. The convulsions generally cease after the child is delivered. Schauta found this to occur in 54 per cent. in 185 cases, Ohlhausen in 80 per cent. in 804 cases, and Seitz in 74 per cent. in 147 cases. Furthermore, it makes little difference how the delivery was effected, whether by spontaneous labor, forceps, version or perforation. The convulsions cease as readily after one method as the other, and the maternal mortality is unchanged. Dührssen saw 26 per cent. die after normal labor, and 26 per cent. after operation. Seitz observed 16 per cent. in both instances.

Rapid delivery by operative methods has reduced the mortality in Zweifel's klinik from 32 to 15 per cent. and in Bumm's klinik from 30 to 14 per cent. In selected cases, where delivery was effected immediately after the first convulsions, these same operators reduced their mortality rates to 6.5 and 2.5 per cent. These results from two large European clinics prove that the early removal of the child from the uterine cavity is the best treatment for eclampsia. The choice of methods for delivering depends upon the conditions present in the case. During the second stage, the selection is not difficult. In the first stage and before labor has begun, the question of *accouchement forcè* and vaginal Cæsarean section are to be considered. If the cervix is long, closed and rigid, the vaginal section is indicated, but difficulties may be encountered that cannot be overcome even by the expert. Rapid delivery during pregnancy, where the technical difficulties are great, is frequently more dangerous to the mother than the eclampsia itself. It is a wise procedure to let the patient bleed after labor if possible. The loss of blood relieves the high tension and removes a portion of toxins from the body. If the uterus does not bleed freely, 500 ccm. may be taken by phlebotomy.

In the medical treatment, morphine and chloroform are being used less frequently than heretofore. Morphine interferes with elimination through the kidneys and tends to increase the comatose condition. Chloroform may be used but should not be kept up for hours as it causes fatty degeneration of the heart muscle. Ether is better. Morphine (gr. ¼) may be given at the onset and repeated in 30 minutes if necessary. Chloral (gr. 45) may also be given per rectum and repeated

in two hours. Saline infusions, veratrum and hot packs given after delivery are beneficial.

In these rarer cases where the convulsions persist after delivery, while the amount of urine decreases steadily, the operation of decapsulation of the kidneys, as recommended by Edebohls, has been used. About twenty operations have been performed and sixty per cent. of the mothers saved. The principal difficulty is to determine the proper time for operation. Late operations are always useless.

Finally, we may state that the general tendency is to look upon eclampsia with a great deal of respect, and to resort to surgical methods of terminating pregnancy rather than to depend upon medical measures, believing that the removal of the products of conception from the uterine cavity will most certainly aid in restoring the mother to her former health and strength.

4433 Lake Avenue.

THE ART OF REFRACTION.*

By John Green, Jr., M. D., St. Louis, Mo.

The major part of every oculist's work, variously estimated at from 50% to 75%, consists in measuring the refraction of the eye. Since the publication of Donder's classical work, "The Anomalies of Accommodation and Refraction of the Eye,"—several generations of oculists have given this subject earnest consideration and careful study. The publication, by Snellen, of a standard series of test types, the invention of the various charts for the detection and measurement of astigmatism, the objective measurement of the refraction by the ophthalmoscope, the invention of the ophthalmometer, the use of cycloplegics, and lately the development of the shadow-test, are earnest of the universal efforts to secure means of accurately measuring the refraction of the eye. One might naturally infer that, as a result of this exhaustive study, the methods of examination would be definitely fixed. That this is far from being so I am sure all will agree. Rather it appears that there are scarcely two oculists who, in all particulars, follow the same routine. Granted that there is more than one way to kill a cat, and that all roads lead to Rome, it seems rather extraordinary that there should not be some "best method" approved by the preponderance of authority.

Despite the thorough manner in which methods have been discussed, there still remains serious disagreement on some of the essential points. If we listen to the "Philadelphia School," for instance, we learn that an attempt to measure the refraction without a cycloplegic is little short of criminal, and will inevitably be followed by failure to relieve the symptoms. Our friends in New York, ridiculing the Philadelphia idea, pin their faith to the ophthalmometer and forswear the use of cycloplegics. And thus the merry war is waged to the confusion and bewilderment of the young oculist.

The writers of text-books vie with one another in giving lucid and minute descriptions of ocular diseases, pathologic ocular lesions and methods of treatment. *Per contra,* there seems to have been a conspiracy to wrap the subject of refraction in an impenetrable veil by discussing it in abstract generalities. Granted that practical refraction can only be learned by contact with patients in the refraction room, that fact should not excuse the vague, and generally unsatisfactory, treatment which the subject receives in the average text-book.

The subject being in this chaotic state, it follows that the beginner in refraction, not being able to select a method which has the weight of

*Read in the Eye, Ear, Nose and Throat Section at the Annual Meeting of the Missouri State Medical Association, Jefferson City, May, 1909.

authority, is perforce compelled to work out his own salvation. He will weigh this and that suggestion and finally, by a process of selection, will adopt a routine, which, in his estimation, fulfills the requirements. In this paper I desire to present my own method, without claiming for it any conspicuous merit. The details will be gone into somewhat at length as I desire to escape the charge of abstractness and vagueness. I do not claim that the method is infallible and have no doubt that many points will be brought out in the discussion which may lead me to modify my present routine. It is only by a free interchange of views that we shall ever arrive at anything like a satisfactory and generally accepted method.

In the first place I have styled my paper the "Art of Refraction," and by that I mean the art of selecting lenses which, in any given case, will abolish the symptoms for which the patient consults us. We should never forget that the patient consults us to secure relief. He is not at all enthusiastic that we, in our pride, have learned to measure his static refraction to the ⅛th of a diopter. He wants a glass that will enable him to perform his ocular function without strain or difficulty. He does not wish to be forever reminded that he has a pair of eyes. He demands relief from pain and from headache. If we do not give him this, we have not mastered the "art of refraction," however skillful we may be in its scientific application.

As a preliminary to the study of a case of refraction, I deem it important to secure a general idea of the patient's physical condition, with especial reference to recent ailments. I believe that the oculist should approach every case primarily from the standpoint of the physician. As, in most cases, it is not feasible or practicable to subject the patient to a general physical examination, it follows that we must depend mainly on the anamnesis to furnish a clue to the origin of symptoms. The inquiry should be directed especially to eliciting a possible nasal or accessory sinus involvement; nor should we neglect to ask questions with respect to the general conditions, especially gastric and intestinal disorders, and, in a woman, pelvic and menstrual anomalies.

By thus obtaining at the outset a general survey of the patient's general condition, it is often possible to direct our inquiry at once into channels proper for the immediate elucidation of the problem at hand. In my own experience it is surprising how frequently I have come upon a train of symptoms that led me immediately to abandon ocular examination and to refer the patient to a rhinologist, a neurologist, internist or a gynecologist for examination. In a word the oculist's attitude at the conclusion of his history taking should be, either that the case is not primarily within his jurisdiction, or, by the reasonable exclusion of extra ocular factors, that the origin of the symptoms depends on uncorrected ametropia or muscular imbalance.

A discussion with respect to the previous ocular history is then entered into and I make it a point to secure a consecutive history of any

and all eye-symptoms from the earliest age of the patient to the present. If headache exists, its kind, periodicity, location, etc., is discussed. The ability to use the eyes under various conditions is entered into, and the occurrence of local or reflex manifestations is dwelt upon. By thus entering systematically into the subject, facts are frequently elicited which may have a distinct bearing on the present management of the case. The next step consists in taking the vision of the patient for distance and near, with each eye separately and without a correcting glass (I hope I may be pardoned for alluding to many perfectly obvious points, but, as I stated, I desire to take a personal view and to escape the charge of vagueness). Immediately upon the conclusion of this test I make a careful examination with the ophthalmometer. In the presence of astigmatism I determine with all accuracy the axis and amount of the corneal astigmatism to the end that I may have at the very outset a guide to the general "roughing out" of the case. Let us suppose that V without lens is 6-8, and that the ophthalmometer indicates an astigmatism of 2 D. with the axis at 90°. It is fair to assume that the refraction is a hyperopic astigmatism. I immediately place a plus 3 Sph. on both eyes and take the vision first with the two eyes then with each separately. The vision will probably be found to be 6-10 or 6-12. Wearing plus 3 Sph. the patient is then allowed to wait for 10-15 minutes in the waiting room to secure, if possible, some relaxation of his accommodation. On his return to the refraction room, his attention is at once directed to the astigmatic charts—and I greatly prefer the charts of Verhoeff—and he is asked to select the sharpest and blackest line. If, as is probable, he selects the 90°, I substitute the second chart and begin by adding minus cyls. at 180° beginning with —.25 and substituting successively stronger — cyls. in increasing strengths until the two principal lines are equalized. Let us suppose that on the addition of —1.5 cyl., axis 180, the lines are rendered uniform. Vision has now risen to 6-8. A weak — sph. (.25 D.) is added and the patient's vision has risen to 6-6 plus. The patient is now asked to confine his attention to the finer lines comprising the quadrants, and he is asked to compare the upper and lower sections (of horizontal lines) with the lateral sections (of vertical lines). It will frequently be found that, although the principle or wide lines appear perfectly uniform, there is something in favor of one or the other set of sections. Usually the addition of a —.12 or + .12 cyl. axis 180° will suffice to render the entire diagram perfectly uniform. Vision will now be 6-6 or better. A slight shift in the axis of the cyl. will often appreciably sharpen the letters.

I have dwelt thus minutely on the well-known "fogging" method because I believe that, patiently applied, it will, in the great majority of cases, yield a measurement which, while it may differ somewhat from the static refraction, is of great value in indicating to the examiner the glass which the patient will accept with comfort. Those who have not adopted this, or a similar method, will be surprised to find how fre-

quently the result approximates the static refraction. Of course, if we are dealing with an accommodative spasm, the difference between the two results will be considerable.

After the fellow eye has been similarly tested, the patient is placed in a comfortable position, in a good light. He is given a recent issue of a well-printed magazine (preferably one with several sizes of type) and is instructed to *read continuously without lifting the eyes from the paper.* This test is prolonged for from ½ to 1½ hours. From time to time the examiner approaches the patient and inquires how all is going; if the answer is satisfactory, the patient is directed to continue to read.

By this test several important points are determined: In the first place, is the correction comfortable and pleasant or otherwise? Second, does it at first seem uncomfortable, and as the reading is prolonged become more acceptable? Third, are symptoms, such as blurring or wavering of the letters, drawing sensations, pain in the eyes and head, reflex nausea, etc., less marked or abolished or *vice versa?* In a word, does it appear likely that this manifest correction will ameliorate or abolish the symptoms, or is the patient undecided as to the effect of the glasses, or, on the contrary, do they seem to accentuate the symptoms?

This preliminary examination, occupying, as it does, the better part of two hours, leaves the patient in a state of ocular and mental fatigue. At this point the following prescription is given: Homatropin hydrobromate, gr. 1; cocain hydrochlor, gr. ¼; aquæ dest, ℥ss., with directions to instill one drop in each eye at bed time and on arising the following morning. The patient is directed to bring the drops to the office, where the office assistant begins the instillation at regular intervals of 10 minutes until five drops have been instilled. Thirty-five minutes after the last drop has been used the examination is begun by taking the distant vision of the eyes now thoroughly under the influence of the cycloplegic.

Immediately thereafter the patient is placed in the dark room and the examination of the refraction with the skiascope made. It is unnecessary to enter into the details of this method so familiar to all of you. My preference is for the method with the plain mirror, with the source of illumination above and a little behind the patient's head.

To facilitate the determination of the distance between the examiner and the patient, a tape one meter long is attached to the trial frame. After determining the point of reversal for the meridian of least refraction, cylinders of varying strengths at the appropriate axis are added until reversal is obtained to all meridians. Great pains are taken to determine the exact axis as well as the amount of astigmatism as it has been my experience that the more careful one is in applying this test, the more nearly will his result coincide with the trial-case measurement.

The lens combination, as determined by skiascopy, is then placed before the eyes and the vision taken. The next step consists in varying the

combination of lenses to determine whether some combination, other than the one indicated by the skiascope, may not be preferred. To this end I have adopted the routine suggested by Duane and styled by him the "Round of the Trial Case." The correction being in general a spherical glass A. and a cylinder B. I add, one after another.

1. A convex sphere, say + .5.
2. A convex cylinder with its axis in the axis of B
3. The same cylinder with its axis at right angles to B } + .5 cyl.
4. A concave cylinder with its axis in the axis of B
5. The same cylinder with its axis at right angles to B } — .5 cyl.
6. A concave sphere. — .5 sph.

These additions form, as pointed out by Duane, a series of combinations which represent practically all changes that can be made in the sphero-cylinder combination A. B. Then if A. and B. are both convex, the additions made will be:

1. Add to A. and leave B. alone.
2. Add to B. and leave A. alone.
3. Diminish B. and add to A.
4. Diminish B. and leave A. alone.
5. Increase B. and diminish A.
6. Diminish A. and leave B. alone.

As soon as, in making the round, it appears that the added glass has improved vision, the resultant combination is substituted, and the "Round of the Trial Case" repeated, this time with .25 D. spheres and cylinders.

I very shortly reach the point where I get a combination that is not improved by any addition (+ or — sphere or cylinder). Slight variations are then made in the axis of the cylinder, which, if accepted as an improvement, is adopted. A disc with a 4 mm. circular opening is then slipped in front of the combination in order to exclude extra pupillary rays. If the combination is correct, this will have the effect of materially sharpening the letters.

The examination under a cycloplegic concluded, the patient is directed to return in a few days for the post-cycloplegic test. This is conducted in two ways: First, the method with the aid of astigmatic charts (described as the preliminary test) is used and the result reached in a precisely similar manner; second, the combination obtained under cycloplegia is placed before the eyes and by conducting a "Round of the Trial Case," it is determined to what extent the cycloplegic finding may have to be modified. Needless to say, the results of these two methods generally agree very closely.

By adopting the above described routine, the examiner is in possession of the following facts:

1. A knowledge of the dynamic refraction carefully worked out.

2. A knowledge of the actual behavior of the eyes for far and near under the influence of this "dynamic" correction.

3. A knowledge of the static refraction and of the difference between the dynamic and the static.

4. A knowledge of the manner in which the eyes respond to tests after the cycloplegic has worn off.

(I may say parenthetically that as this paper is confined to a discussion of the "art of refraction," no allusion will be made to abnormal functioning of the extrinsic ocular muscles, or muscles of accommodation. Such abnormalities will often demand modification of the refractive findings.)

The examiner, in possession of these facts, must then determine precisely the strength and combination of lenses that in all likelihood will give the patient *immediate relief*. How far shall the prescription deviate from the manifest correction? Shall a balance be struck between the dynamic and the static result? If the axis of the cylinder differ in the two measurements, which shall be accepted? Shall the full static result be accepted? These are the principal problems that confront us and demand for their solution the nicest tact, judgment and discrimination, which can only be acquired by prolonged contact with patients in the refraction room.

Let us not forget that the patient comes to us for relief, immediate relief. Do oculists who order a pair of glasses on the basis of the static result alone, and tell the patient that he will get used to them in a month or so, realize that they are offering a stone where the cry is for bread? Why is it necessary to torture a patient with static glasses which our preliminary and post-cycloplegic tests indicate will not be tolerated? Is it not more rational to prescribe the glass which will give the patient immediate comfort and satisfaction? As we have a knowledge of his static refraction, we can foretell, with reasonable certainty, that, as time passes, more and more of his latent error will become manifest. By dealing frankly with the patient, impressing upon him our desire to give him immediate relief, and pointing out that the first correction must inevitably be replaced by a stronger one after the lapse of a certain time, we invite his coöperation to the end that his case may be carried to a successful issue.

One word with reference to the adjustment and mounting of the lenses. I have gained the impression that, as a general rule, oculists are content with indicating the formula of the lenses to the optician, and leave the details of the mounting to his judgment or the fancy of the patient. This practice might be defensible if the judgment of the optician were invariably sound, or if the fancy of the patient always demanded the mounting best adapted to his particular needs. That this

is very seldom the case, I am sure all of you will agree. The oculist is the one to decide what mounting will be most appropriate for each individual case. If his views and the patient's do not coincide (as is frequently the case), he should carefully give the reasons for his position and use every effort to win the patient to his way of thinking. I have so frequently seen the work of competent oculists nullified by improper mounting of the lenses, that I feel that we should, if only for our own protection, insist on the carrying out of all the details in accordance with our own ideas.

625 Metropolitan Bldg.

CASES OF CEREBELLAR TUMOR, WITH THE STATISTICS OF THIRTY OPERATIONS.*

By Harvey Cushing, M. D., of Baltimore.

CASE I. In this patient the operation was performed eight months ago; a tumor was removed from the right cerebellar hemisphere. One of the photographs (Fig. 1), which I will pass around, shows the tumor in its natural size, and the other (Fig. 2), the back of the patient's head a few days after the operation. He has done well; has grown fat and strong, and is back at work. There was a gain of fifty pounds in weight in the early weeks after the operation.

The symptoms in this case were not very definite. There was some slight ataxia, a high grade of choked disc, headache and a little mystagmus—enough we thought, to justify making an exposure of the cerebellum. We found and extirpated this cystic tumor, which Dr. Mallory regards as a glioma, but I think you can see that it is definitely encapsulated; and this brings up the question of the gross characteristics of gliomata—whether they are always infiltrating, or whether they are sometimes encapsulated.

In spite of the advanced grade of choked disc present before the operation, the patient has fortunately escaped with but very little disturbance of vision. You can see that he now walks without any ataxia and looks healthy and vigorous.

CASE II. This patient, a physician, who has kindly consented to come before this meeting, is one of four of these suboccipital cases now in the hospital. Though operated upon only three weeks ago, I think you can see how solidly and well the wound has healed (Fig. 3), with perfect use of the muscles of the neck. The cervical muscles were divided and a bilateral bone defect made in the suboccipital region, including the posterior half of the foramen magnum, as in all operations of this type. We did not find a growth in this case, the procedure resulting merely in a suboccipital decompression. There has been a marked amelioration in symptoms which had been thought by many to be purely of labyrinthine origin. His choked disc has completely subsided. He is rapidly gaining weight and strength and promises soon to become as vigorous as the patient you have just seen. There is always the possibility, after such a palliative measure, that in the course of time a second operation may reveal a growth which can then be enucleated.

CASE III. This young man is a carpenter, 24 years of age. Four years ago he began having headaches and unsteadiness of gait, and came to the Johns Hopkins Dispensary, where the diagnosis of "nervous headaches" was made. His eyes were examined at the time and nothing abnormal found. During the following years he grew progressively worse and pressure symptoms became pronounced. Eight weeks ago, in another city, an operation was performed on the left side of the head, with aspiration of what was supposed to be a cyst—unquestionably aspiration of the lateral ventricle.

*Remarks upon cases exhibited before the Johns Hopkins Hospital Medical Society, May 3d, 1909.

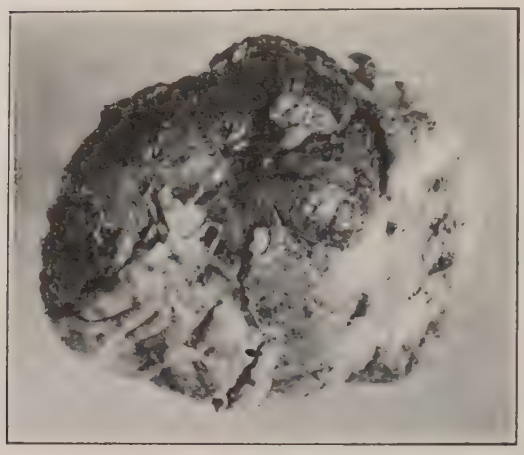

Fig. 1. External view of tumor removed in Case I., with attached fragments of cerebellum. (Natural size.)

Fig. 2. Case I. Photograph taken prior to patient's discharge from the hospital, to show situation of incision.

When he came under our observation the symptoms pointing to a cerebellar lesion were unmistakable. We thought they indicated a right extracerebellar (cerebello-pontine) tumor, such a lesion as I will show in one of these specimens; but the growth proved to be a left intra-cerebellar cystic tumor—a cystic glio-psammoma about the size of a hen's egg, and I suppose actually a rather benign lesion—which was entirely extirpated two weeks ago. This was a striking illustration of the advisability of a bilateral exposure for these cerebellar lesions.

I think you can see here the typical cross-bow incision by which the approach is made in these cases (Fig. 4). Unfortunately the patient's vision, even before the first operation was performed, was almost completely lost. Some vision is apparently returning, and he can now count the fingers of the hand, but I fear that we cannot expect much more than this. The choked disc is rapidly subsiding, leaving exposed the atropic nerve head. In other respects he will, I am sure, make a complete recovery.

Comment. Of the two other cerebellar cases at present in the hospital one had a cerebellar cyst which could not be totally extirpated, as in the patient just shown (Case III.), but the contents were evacuated and a portion of the thin wall removed. She, too, promises to make a satisfactory recovery, fortunately with little if any loss of visual acuity. The other patient is one in whom no lesion was found, as in the second patient shown you tonight (Case II.), but it is hoped that the operation will serve to relieve his pressure symptoms.

Some days ago I received a letter from a friend in a distant city asking for the statistics in regard to our cerebellar cases. I have looked them up and think the figures may be of interest. As a matter of fact, they are the real occasion of my making this report this evening.

There have been thirty operations for known or presumed cerebellar tumor, with the permanent bilateral removal of bone through the cross-bow incision in the overlying tissues. In no case has the wound been drained.

At the time I gathered these notes there had been two deaths, but within the past two or three days we have lost a child who had a cerebellar tumor, too radical an attempt to remove which was made; so that now, in this series of thirty-one cases, we have had three deaths directly attributable to the operation. One of them—I will show you the brain—was a patient with a typical cerebello-pontine lesion—the benign endothelioma which nestles in the recess of the medulla, pons and cerebellum—a lesion we now regard as very favorable for operation. The patient unfortunately died from pneumonia. This was one of our earliest cases and was undertaken before we had a satisfactory table-extension which ensures free respiration during this particular operation. Death occurred in a second case on the operating table; the patient, who was completely blind and deaf, had a large vascular tumor involving the region of the corpora quadrigemina, in the investigation of which bleeding occurred into the fourth ventricle, with immediate respiratory failure. In the other cases, with the exception of the one I will refer to in a moment, there have been no operative complications whatsoever.

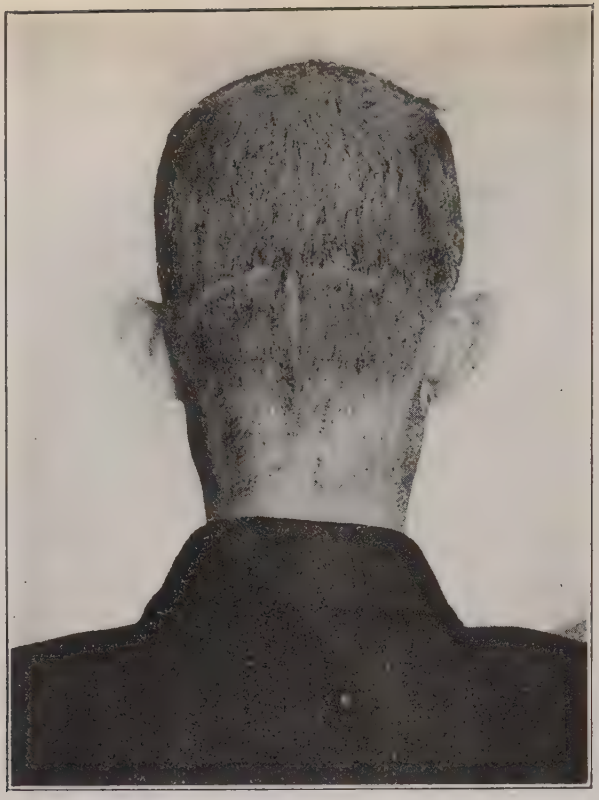

Fig. 3. Case II. Photograph taken prior to patient's discharge from the hospital, three weeks after operation, to show usual solidly healed and inconspicuous wound.

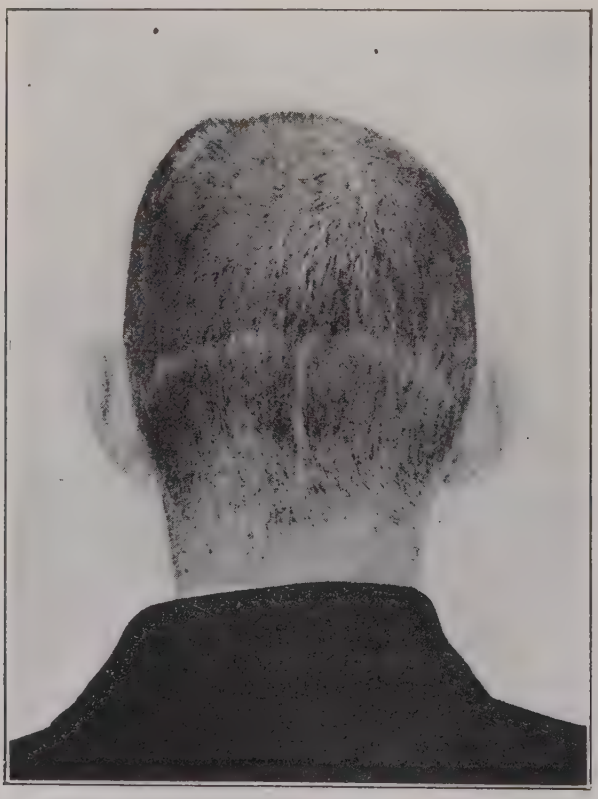

Fig. 4. Case III. Photograph taken three weeks after operation, showing usual solidly healed incision. Note situation of slightly elevated osteoplastic flap made at previous operation over left cerebral hemisphere.

The tumor has been disclosed at operation in thirteen cases. Three of them were more or less solid intracerebellar tumors which have been extirpated; four were cysts that were simply evacuated or a portion of the wall removed; and four of them were benign extracerebellar (cerebello-pontine) tumors which were wholly or partially removed. There were two cases in which tumors were found and considered irremovable, with little or no improvement after the operation.

There have been twelve cases in which the tumor has not been found, the operation resulting in a simple suboccipital decompression, as in the case of the second patient shown you tonight. Two cases from this group were operated upon subsequently; in one a cyst was found and evacuated; in the other a solid tumor was removed.

These figures I think are gratifying, especially when one realizes that cerebellar tumors are considered by many to be the most unfavorable for operation of all growths of the encephalon.* It is our impression to the contrary, that they are more likely to be accessible, are capable of an earlier diagnosis, and are less likely to leave symptomatic disturbances after removal than in the case with brain tumors situated elsewhere—certainly the statistics are very promising, with eleven instances of removal or evacuation of cysts in this series of thirty-one cases of cerebellar operations.

One interesting fact has been brought out by the review of these cases, namely, the frequence of mistakes in diagnosis. Many of these patients undoubtedly had possessed a lesion for years; one of them, for example, was treated for deafness for eleven years before an "acoustic neuroma" was suspected, owing to the onset of pressure symptoms. With a reasonable assurance that this extensive operation can now be conducted with a minimum of risk our tendency has been toward a prompt exploration in suspicious cases; but nevertheless, in spite of this tendency, in a recent case we have made a serious diagnostic blunder.

The patient, a baby 3 years of age, was in the hospital a year ago under my care. At that time I had no suspicion that the trouble might be due to a cerebellar tumor, but considered the case a typical one of simple or essential hydrocephalus, as did many others who had seen the patient. The father, a physician, recently brought the child back, in the hope that we might check the advancing enlargement of the head by some radical method of ventricular drainage. The suspicion of a possible cerebellar lesion was aroused at this time, and a large cyst was disclosed at operation. I attempted to extirpate the cyst, with a fatal result, for the child died suddenly a few hours after the operation—

*I feel confident that the adherence by C. H. Frazier to a unilateral method of approach to cerebellar tumors, advocated likewise by Krause, is the occasion for his and Dr. Spiller's repeated statement that these are the least satisfactory of all brain tumors for operation. It may necessitate, as Dr. Frazier has explained, the partial removal of the cerebellar hemisphere to gain access to the lateral recess. The matter has been reviewed by P. Lecène in the Journal de Chirurgie, 1909, Vol. ii., p. 36.

possibly a "thymus death," as we found the characteristic glandular enlargements at autopsy. Had I satisfied myself with a simple aspiration or partial removal of the cyst-wall in all probability we would have saved the child. The brain shows very well the large cystic cavity and the great dilatation of the ventricles (Fig. 5).

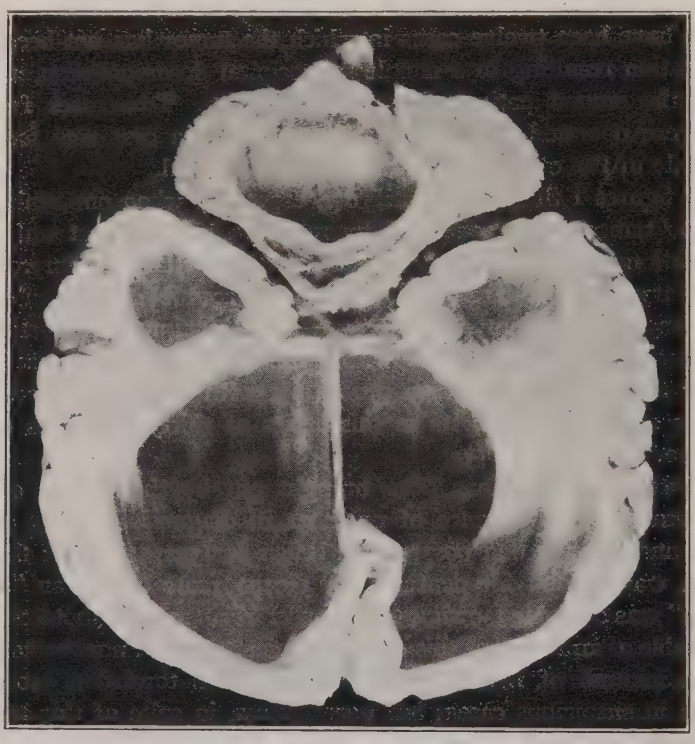

Fig. 5. To show high grade of internal hydrocephalus consequent upon a cystic glioma of the cerebellum. The margin of growing tumor is apparent at upper edge of cyst.

The first of the patients presented was seen by one of my colleagues about a year ago. The history and examination revealed nothing except the vomiting and headaches and the condition was naturally supposed to be one of simple gastric disturbance and was so treated for a time. The second patient, as I have said, was thought for a long time to be the subject of labyrinthine disease, and other illustrations might be given. A particularly large number of these patients have at one time or another been treated for hysteria.

The mistaken diagnoses really make a professionally disconcerting record. A frequent result of the delay is blindness. The last patient shown (Case III.), with a successful extirpation, is shut off, for this reason, from future ability to earn a livlihood by his previous trade. Out of these eleven successful cerebellar operations, six patients have been

totally blind at the time of operation, and this points the moral of these remarks. The first patient shown this evening (Case I.) was operated upon for what would ordinarily be regarded as very inconclusive local symptoms, but feeling that the exploration is attended with no great risk the chance was taken and the tumor found and removed before there was any permanent damage to the optic nerves.*

*Addendum. Since making this report there have been four subsequent operations with recovery. In two of them the lesions were not disclosed. In the third a cerebello-pontine endothelioma was enucleated; and in the fourth a suboccipital osteoma, with cerebellar symptoms due to indentation of the hemisphere was successfully removed.

This makes thirty-five operations; with three fatalities; with thirteen successful extirpations or cyst evacuations; with two exposures of inoperable growths; the condition remaining practically unimproved despite the decompression; and with seventeen palliative decompressions.

ACUTE PROSTATITIS.

By Henry Jacobson, M. D., of St. Louis.

Extension of the gonorrhœal inflammation from the posterior urethra into the prostatic ducts and glands is the most frequent cause of acute prostatitis. The use of instruments in the posterior urethra causing slight injury of the prostate, thereby opening an avenue of infection for the bacteria that are present in the urethra, or that are causing the cystitis, or as has been demonstrated by experiments to pass from the rectum through the intercommunicating blood vessels and lymphatics, may cause it. La grippe, tuberculosis, typhoid fever, scarlet fever and smallpox may cause inflammation of this gland. Pyæmia may cause abscess of the prostate. Masturbation and excessive intercourse are supposed to be a cause of catarrhal prostatitis.

There are three varieties of acute prostatitis. First, catarrhal inflammation, which is usually mild, involving the mucosa of the prostate, ducts and glands; this is especially localized in the region of the mouth of the ejaculatory ducts. If due to gonorrhœa, the gonococci, epithelial cells, lichen bodies less than in health, pus cells and red blood corpuscles, are found in the prostatic secretion examined under the microscope. In the second variety the follicles are involved. They are filled with exfoliated epithelium, pus and red blood corpuscles. The mouths of these ducts are closed by adhesive inflammation, several of these follicles coalesce and large or small retention cysts result. In the third form, the inflammation extends to the interstitial tissues. There is destruction of the glands, and the interstitial tissues. Round cells in vast numbers invade the inflammatory zone, lymph and fibrin are poured out in abundance from the vessels, and pus can be demonstrated microscopically.

Abscesses form, the size of which are dependent on the limit of the inflammatory zone. This variety is called parenchymatous prostatitis. A cross-section in the first stage of parenchymatous prostatitis shows the swollen, large, succulent prostate of a dark red color. A section of the gland in the second stage demonstrates the invasion of the gland by the pus cells which give it a gray color. In the third stage, that of destruction of part of the gland, we find abscesses.

As the veins of the suprapubic connective tissue, called the cavern of Ritzii, intercommunicate with those of the prostate, septic thrombi may be carried there from the inflamed prostate and form an abscess, as was reported by Kieln (in the Handbook of Urology) in two patients with parenchymatous prostatitis. The same communication occurs with the veins of the bladder and penis. Several cases have occurred in which

gangrene of the penis complicated this severe infection of the prostate. Guyon reports a case, in which upon operation, he found the entire prostatic urethra surrounded by an abscess.

A small percentage of patients with catarrhal inflammation of the prostate present no subjective symptoms. The greater number have increased, and urgent desire to urinate, or slowness and diminished volume of the urinary stream. In the different varieties, according to the severity and the individual affected, there may be a rise of temperature, chills, dysuria, complete or incomplete retention of urine, interference with defecation, hemorrhoids, pressure in the rectum and perineum, pain also in said regions besides in the back, down the thighs, in the testicles and penis. Careful rectal examination reveals a painful, swollen, hot, enlarged prostate with areas of normal hardness. Others are softer, and in the suppurative stages we can often detect fluctuation of the abscess cavity. Fortunately for the patient, the abscess usually ruptures into the urethra, which is the most favorable route. If it has a large opening into the urethra, the cavity fills in from the bottom with granulation tissue and the patient makes a rapid recovery, with a replacing of the destroyed glandular tissue with fibro-connective structure, which causes a contraction of the involved lobe or lobes and as a result more or less atrophy of the prostate gland.

If the abscess cavity is large and communication with the urethra small and narrow, pus and urine are retained in the cavity. The patient may become uræmic, or septic. The infection may spread to the bladder, abdominal walls, or kidneys, causing pyelonephritis and end in the death of the patient. The abscess may extend into the prevesical space, or in the ischiorectal space, or open into the rectum, terminating in a recto-urethra fistula. If it points in the perineum it is easily opened by the attending surgeon. A fatal, but fortunately rare, route for it to take is to rupture into the peritoneal cavity.

Segond (in the Handbook of Urology) reports 144 patients with prostatic abscess that terminated in 34 deaths; 70 patients made a good recovery, and 10 passed into the chronic stage with persisting fistula. In 35 patients the abscess ruptured into the urethra with 10 deaths. In 45 of his patients it perforated the rectum and 7 of these died. There is a very marked increase in the number of recoveries if the surgeon opens the abscess as soon as detected. Therefore it is our duty to urge an early operation, whenever we detect a prostatic abscess. In Segond's collection, the mortality was 25.3 per cent. in those suppurative cases that were treated expectantly, and only 11.6 per cent. in the cases that submitted to an operation. Zuckerkrandl gives a mortality of only 5 per cent. in 20 patients with prostatic abscesses that he operated upon. Casper reports 30 patients in which he employed operative procedure without a death. Hinrich operated upon 32 with two deaths.

The best approach to the abscess is the perineal incision on the side of the urethra, according to which lobe is involved. If both lobes are

involved make the Prost semilunar incision as for removal of the prostate, then open the abscesses, wash out gently with iodine solution or bichloride solution followed by normal saline, and introduce a drainage tube or tubes; wash out the cavity daily and shorten the tubes as needed. The temperature rapidly falls after this procedure. If it again develops in a few days it is due to a new abscess, which must be searched for and opened.

In the acute catarrhal or follicular prostatitis which, as before mentioned, is a frequent complication of gonorrhea, we must stop all urethral treatment, put the patient to bed, with his hips elevated, give a purgative, give internally urinary antiseptics and remedies to control the pain. Usually it is necessary to give a hypodermic injection of morphia and atropine, or give the patient opium combined with belladonna in the form of suppository. Ice cold water run through a rectal thermophore continued for thirty minutes and then repeated every three hours for the same length of time, if agreeable to the patient, will usually prevent the inflammation from terminating in the formation of an abscess. I find many patients in which hot water run through the rectal thermophore, or double catheter, is agreeable and soothing and ice cold water increases the pain. Many patients rapidly recover, others become chronic and have to be treated for months, but utlimately recover.

Chronic Prostatitis. This is a disease that occurs quite frequently and with its far-reaching reflex symptoms, is often mistaken for other diseases. As I mentioned, acute inflammation may terminate in the chronic form. So we have the same varieties, catarrhal, follicular, interstitial or parenchymatous, and the same causes mentioned for the acute disease. Gonorrhea is the most frequent cause. Stricture of the urethra, excessive intercourse, masturbation, cystitis, hypertrophy of the prostate and syphilis, are causes. In this paper I will not take up tuberculosis of the prostate. Proctitis and periproctitis may cause acute or chronic inflammation of the prostate. Some patients referred to us for treatment of their gleet will tell us they occasionally notice, if constipated, while at stool, a slight discharge of whitish fluid from the penis, and perhaps increased frequency of nocturnal emissions. This mild form of prostatic inflammation can be diagnosed by introducing a catheter gently to the cut off muscles and washing out the urethra until the return fluid comes back clear of filaments. Then massage the prostate and have the patient urinate and examine the flocculent sediment with the microscope. This reveals pus cells, red blood corpuscles, sago-like and small lichen bodies.

The great majority of patients with chronic inflammation of the prostate gland present numerous symptoms. There is usually an increased frequency and urgent desire to urinate.

He may have severe dysuria, groaning with pain. Investigators have found the prostate and its capsule very richly supplied with nerves from the lower dorsal, lumbar and sacral plexuses. Also the abdominal sympathetic plexus sends numerous branches into the prostate. Large

nerve ganglia have been demonstrated in this gland and under its capsule. These nerves and ganglia intercommunicate with the nerves of the abdominal viscera, kidneys, sciatic and crural nerves. So during the inflammation of this gland these nerves and ganglia are irritated, compressed and party destroyed and exhausting impulses, manifested by radiating pains to all the neighboring and distant viscera, occur, as well as neuralgia of the crural and sciatic nerves.

I have a patient under my care, who was sent to me two years ago. At that time he suffered with severe pains in the region of the gall-bladder, also slight pain in small of his back. His disease was diagnosed gallstones, and an operation advised. He consulted another physician who suspected prostatic disease and he referred the patient to me. Upon examination I found two large retention cysts of the prostate that yielded three or four teaspoonfuls of flocculent sediment in the urine passed after massage of the prostate. During the massage of the gland, he stated the pain became worse in the gallbladder region. After a month's treatment, this pain only recurred when he would delay too long in his prostatic massage. At present he can stay away for two months without feeling any pain. The prostatic retention cysts have almost entirely disappeared. He has never had real gallstone colic, nor Murphy's sign of interference with breathing when I pressed deeply in the gall-bladder region. He has not been jaundiced nor had attacks of vomiting.

Notthaft, in *Archives of Skin Diseases and Syphilis,* relates a similar case, in which the patient complained of severe pain in the region of the gallbladder, also in the renal region, which he found was due to chronic prostatitis, and which yielded to treatment of the prostate. At present there are three patients under my care and observation for chronic prostatitis; one has also vesicula seminitis, whose most prominent symptom is neuralgia of the sciatic nerve.

Dr. O. Zuckerkandl, in 1903, removed an enlarged prostate in a young man 27 years old, suffering from chronic prostatitis, having residual urine, chills, high fever, dysuria, loss in weight, radiating pains down the thighs, to the abdomen and back and in the testicles. He manifested these symptoms for three years before the operation, which resulted in a rapid recovery.

The prognosis as regards sterility. As is well known, it is necessary for the semen to be mixed with healthy prostatic fluid to keep the spermaozia alive and for them to retain their fecundating power. As long as we can demonstrate pus cells in the microscopic field, so long is the prognosis bad. We must always remember, even if the lichen bodies rapidly reappear and the pus cells disappear, that the patient may be permanently sterile, due to the obliteration by stricture or compression of the ejaculatory ducts by new fibro connective contracting tissue replacing the normal glandular tissue.

About five years ago a patient was sent to me suffering with acute prostatitis which did not entirely yield to treatment. About six months

after his acute attack, he returned stating that when he had nocturnal emissions the discharge contained blood, and during intercourse, he would have pain above the pubes. His anticipations of indulging again were unpleasantly marred by the fear of the recurrence of this pain. I found evidence of chronic prostatitis, which yielded to treatment. He has not had any recurrence of his symptoms for the last two years.

One patient states that for several years he has erections and is able to copulate, but there is no noticeable emission. This has a psychic effect and as a result his desire for sexual congress has vanished. He, as with a number of other patients, has an inherited neurotic tendency, bad environment and habits which bring on sexual neurasthenia.

Another patient with symptoms of hot head, exhaustion pains in the limbs, suffering with chronic prostatitis and presented as chief symptoms, tenesmus after urinating, radiating pains from the prostate to the neighborhood of the appendix, had his appendix removed against my advice, in Cincinnati, by a noted surgeon, with a recurrence of the pain shortly after the operation. The appendix was apparently normal with the exception of a varicose vein. He has symptoms of depression at times, also crying spells. Insanity and suicide in neurotics may result from chronic prostatitis. Rape may be the result of the irritation and almost constant erection in some negro patients suffering with this disease, as has been mentioned by J. Boehm.

A rare symptom described to me by several patients is that of bubbling above the pubes. I have not been able to find any mention of this symptom in the literature at my command. Our main reliance in treatment is upon emptying the retention cysts of their contents by massage, and I believe the physician's finger is more accurate and is superior to any instrument. Follow the massage by antiseptic irrigation of the bladder.

Gain the confidence of your patients, especially the neurotics, and give them a hopeful prognosis. Listen patiently to their report of new symptoms. These patients should have nerve tonics, regular outdoor exercise, of which the best is walking. If their means permit, general massage several times a week. Look after their diet, see that they obtain as much sleep as possible. If there is vesicular seminitis present, they should be massaged.

If he has urethritis, it should receive treatment. If the inflammation occurs in a patient with true hypertrophy of the gland, it should be removed. Cystitis, if present, should be treated.

The prognosis is good if we can control our patient and he does not become discouraged by the slow progress made.

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MEDICAL AND SURGICAL PROGRESS.

THE ACTION OF THE VARIOUS PREPARATIONS OF ERGOT UPON THE UTERINE MUSCLE.

A REVIEW OF RECENT LITERATURE.

By Hugo Ehrenfest, M. D.

1. Der heutige Stand der Mutterkornfrage.—A. Bennecke (*Arch. f. Gynack.*, Bd. 83, p. 669).
2. Untersuchungen ueber die Bedeutung des Mutterkorns fuer die Geburtshilfe.—Palm (*Arch. f. Gynaek.*, Bd. 84, p. 655).
3. Experimentelle Untersuchungen ueber die Wirkung der Mutterkorn-præparate.—E. Kehrer (*Arch. f. Gynaek.*, Bd. 84, p. 610).
4. Ergotinine Citrate.—(*Journ. A. M. A.*, December 19, 1908, p. 2161).
5. Physiologische und pharmakologische Versuche an der isolierten Gebaermutter.—Kurdinowsky (*Arch. f. Anat. u. Physiol. Phys. Abth.*, 1904, p. 372).
6. Physiologische und pharmakologische Untersuchungen an den ueberlebenden u. lebenden inneren Genitalien.—Kehrer (*Arch. f. Gynaek.*, Bd. 81, p. 160).
7. Klinische Beobachtungen auf dem Gebiete der Geburtshilfe.—Schubert (*Muench. med. Woch.*, No. 26, 1907, p. 1266).
8. Klinische Erfahrungen ueber die Wirkung des Secacornin.—Thomson (*Zentralbl. f. Gynaek.*, No. 22, 1908, p. 2130).
9. Physiologic Assay of Fluid Extract of Ergot.—Edmunds and Roth (*Jour. A. M. A.*, December 19, 1908, p. 2130).
10. Standardization of Ergot.—Weed and Hofer (*University of Pennsylvania Medical Bulletin*, February, 1909).

A very exhaustive article by Bennecke (1) attempts to give an exact picture of the present status of our knowledge concerning the chemistry and physiologic action of ergot and its numerous preparations. He divides the various constituents, thus far isolated, into three groups. To the first group belong the coloring substances, phosphoric acid, fats, cholesterin, lactic acid, mannit, mannan, fungin, etc. They all prove inert. The second group comprises isocholin, ergotic acid (sclerotinic, ergotinic, secalo-amido-sulfonic acid), ergotin or ecbolin, ergotinin, picrosclerotin and clavin. These substances exhibit slight physiologic activity. Bennecke places into the third group the substances which exert a pronounced action and either produce gangrene, convulsions or uterine contractions. Sphacelic acid is a strong vasoconstrictor and

easily produces gangrene. According to Kobert and Kurdinowsky, it causes tetanic contractions of the uterus, the action being a peripheral one, *i. e.*, is exerted upon the uterus directly, not by way of the central nervous system. Sphacelotoxin, prepared by Jacobj as a purer form of the acid, shows practically the same physiologic action. It was regarded by him as the ecbolic principle of ergot, and in the form of a salt, named spasmotin (chrysotoxinsaures Natrum), was used by Palm (2) as a drug capable of strengthening regular labor contractions, also for the purpose of bringing labor on at will. Later investigations have shown that this preparation is extremely unreliable and its manufacturers have taken it off the market. In 1875 Tanret isolated two alkaloids, in his opinion, representing the pure active principle of ergot, a crystalline alkaloid, ergotinin, and an amorphous alkaloid which he thought to be a physical modification of the crystalline. Independently from Tanret, shortly afterwards Kraft also isolated two such alkaloids. He named the amorphous alkaloid hydroergotinin. In his experiments both failed to show any specific action on the uterus, both produced convulsions and both led to gangrene; or in other words, these two alkaloids seemed responsible for those undesirable by-effects of ergot when used for therapeutic purposes. The claim of Kobert that his cornutin represents the active constituent of ergot has been positively disproved by Tanret. According to Keller, ergot contains but one base, and Kobert's cornutin, Tanret's ergotinin and Draggendorf and Podwyssotsky's picrosclerotin, are simply different forms of the same body. Barger, Carr and Dale, according to Bennecke, also isolated that amorphous alkaloid to which they give the name ergotoxin. They found it inactive when given by mouth, producing gangrene when actually resorbed. If the resorption, however, occurred slowly, convulsive symptoms failed to appear, so that they concluded that there is still another substance in ergot responsible for the resulting spasms. According to Bennecke, we have at the present time no positive knowledge concerning those constituent substances of ergot which produce convulsions.

Of special interest to the obstetrician is that substance in ergot which is supposed to exert a specific effect upon the uterine muscle, *i. e.*, the ecbolic principle of ergot.

We may be permitted to give here a few historical notes concerning the use of ergot as an ecbolic, quoting from an article by Kehrer (3) and a historical sketch, entitled: "From Ergot to Ernutin," published by Burroughs, Wellcome & Co.

It can be assumed that the frequency with which abortions occurred during those terrible epidemics of "St. Anthony's Fire," first suggested the presence of an ecbolic principle in ergot. According to Plowright, this action was known to Chinese physicians for many centuries. German and French botanical works of the seventeenth century mention it, and at the end of the eighteenth century, according to Kobert, a governmental ordinance was issued in Hanover prohibiting midwives from using ergot during labor, certainly a proof of the prevalence of this practice at that time. The earliest known direct allusion to the action of ergot on the uterus was made by Lonicer in 1582, and later by Camerarius, who records that women in certain parts of Germany were in the habit of employing spurred grain to accelerate labor. In 1777 Desgranges, having met with several midwives who were accustomed to use the spurred rye in cases of lingering labor, made a great many trials of it and reported successful results. In spite of prejudices and opposition, he con-

tinued strongly to advocate its use, and to his perseverance we no doubt owe, to a very large extent, the use of ergot as a medicinal agent to-day. In America, it appears somewhat doubtful whether its first introduction was due to Hosack or to Stearn. There is reliable evidence that Hosack was the first physician in America to employ ergot to arrest a uterine hemorrhage. On the other hand, it appears that Stearn was the first to use it for accelerating delayed labor. In 1813 Prescott, of Massachusetts, published a dissertation on "The Natural History and Medicinal Effects of *Secale Cornutum or Ergot.*"

Ever since, ergot has been used by the obstetrician and especially by the gynecologist, at times undoubtedly with marked and prompt effect. But, on the other hand, it cannot be denied that our knowledge concerning the *modus operandi* of this drug up to this day has remained extremely meagre. Bennecke states that at present the ergotinin and the ergotoxin are the only two substances left which are claimed to represent the active ecbolic principle of ergot. Very careful investigations, however, contradict the justification for such a claim. Kobert lately has suggested that possibly the ecbolic principle does not always exist in secale in a preformed state. There is, however, nothing known concerning influences which may lead or prevent the formation of this particular substance in the plant. We are forced to assume that climatic conditions, atmospheric influences, the chemic constitution of the soil, the particular species of rye, and other unknown factors, account for the variability of ergot, especially in respect to the total amount of alkaloids it contains. According to Kraft, the ecbolic principle may be formed while the raw plant is subjected to the various chemic influences during the preparation of the extracts, etc. Barger and Dale indeed suggest that this principle is formed in the body through the contact of certain alkaloids with the blood. Bennecke very logically sums up: Our actual knowledge concerning the chemic constitution and action of the so-called ecbolic principle of ergot is nil.

Ergotoxin is an alkaloid, already mentioned in the preceding pages, which has been isolated by Barger and Carr in the Wellcome Physiologic Research Laboratory. It is the hydrate of Tanret's crystalline ergotinin, and in all probability the active principles prepared by Kobert and Jacobj owe their activity to the presence in them of ergotoxin. Ergotoxin has been placed on the market by Burroughs, Wellcome & Co. under the name of "Ernutin." They make the following claims for this preparation: Ergotoxin in suitable doses produces the effects for which ergot is prescribed. The dose can be regulated with a degree of accuracy which has been impossible in the past when only extracts and similar preparations of the crude drug were available.

Careful clinical tests with ernutin have not as yet been reported. Bennecke experimented on animals and obtained results slightly at variance with those of Dale. He suggests that larger doses will have to be used. He cannot agree with Dale's claim that ergotoxin represents the only active principle of ergot, because Dale himself states that ergotoxin, even in large doses, if given by mouth, fails to show any effect. Bennecke concludes that at the present stage of our knowledge, for practical use, secale powder, collected and prepared in a proper manner, must be given preference over all the known extracts and preparations, because the undoubtedly existing great variability of the crude plant, of necessity, leads to a still greater variation in the constitution of those extracts and preparations.

Ergotinine citrate (4) is described as follows in the list of New and Non-Official Remedies published in the *Jl. of the Am. Med. Assoc.:*

According to the investigations of Barger and Dale, ergotinin has very slight physiologic activity when it enters the system unchanged, but it is liable to be converted to a certain extent into ergotoxin,, which possesses marked physiologic activity and appears to represent the pharmacologic action of ergot. The action of ergotinin, when given *per os,* or when injected hypodermically, is variable in intensity, but represents the action of ergot.

It is to be regretted that so far no reliable method of standardizing ergot preparations has been devised. One of the oldest methods is the production of gangrene in the cock's comb. But this method tells little more than that a certain specimen of ergot is active or not. The rise of blood-pressure following the intravenous injection of a standard dose is also suggested as an indication of activity. Such a method is neither accurate nor complete. Barger and Carr claim that preparations containing ergotoxin can be accurately assayed, by physiologic means, for their ergotoxin contents. This is rendered possible by observations of the characteristic action of the alkaloid on the terminal motor elements of the sympathetic nervous system. Still another method especially adapted to the study of the ecbolic action of ergot preparations is that devised by Kurdinowsky (5). He completely extirpated pregnant and non-pregnant uteri of animals and kept them physiologically alive by sending a constant stream of Ringer's fluid through the severed blood-vessels. He added to this liquid a freshly prepared infuse of secale, ext. secale cornutum of Bonjean and Wernich, ergot in hermetically closed tubes (Poehl, also Parke & Davis), Cornutin-Kobert (Merck), and sphacelinic acid (Merck), and although he used these drugs in high concentrations, he failed to obtain any effect upon the uterine muscle except with sphacelinic acid. Very different are results obtained by Kehrer (6) in experiments arranged in a manner very similar to that used by Kurdinowsky. He investigated 26 different preparations. Distinct uterine contractions could be obtained with all the ergotin preparations, but ergotin-Wernich, ergotin-Bonjean, ergotin-Denzel and secacornin-Roche, proved far superior. They usually produced a tetanic contraction of the isolated uterus, a point of special practical importance for the use of ergot preparations as a hemostatic in cases of uterine hemorrhages. Sclerotinic acid, ergotinin, cornutin and spasmotin were distinctly less active, while clavin and ergotinic acid proved absolutely inert. The most interesting fact has been ascertained by the investigations of Kehrer: That vasoconstriction and contraction of the uterine muscle, as the result of ergot influence, are two phenomena which occur absolutely independent from each other. Very good clinical results with the secacornin-Roche have been recorded by Schubert (7), and recently also by Thomson (8). But even such reports cannot change the fact that most of the ergot preparations on the market, and especially the fluid extracts, are extremely unreliable in their physiologic effect. Edmunds & Roth (9) tested eleven specimens of fluid extract of ergot, and found great variation in their physiologic efficiency, some of them being positively inactive, others very weak. Wood and Hofer (10) experimented with fluid extract of ergot obtained from representative manufacturers. Only two out of eleven tested samples were found to be active. In their opinion the fluid extract is not a stable preparation, but deteriorates very rapidly.

TUBERCULAR PERITONITIS IN CHILDHOOD.

A REVIEW OF RECENT LITERATURE.

By Alfred Friedlander, M. D.

1. Tubercular Peritonitis in the Nursling.—Wiel and Pehu (*Arch. de Med. des Enf.*, June, 1909).
2. Pathogenesis of Tubercular Infection.—Roux and Jusseraud (*Arch. de Med. des Enf.*, February, 1909).
3. Tubercular Peritonitis.—Stone (*Bost. Med. & Surg. Jour.*, 1908, p. 705).
4. Operative and Conservative Treatment of Tubercular Peritonitis.—Schmid (*Jahrbuch f. Kinderheilk*, Vol. 66).
5. Operative and Conservative Treatment of Tubercular Peritonitis.—Carpenter (*Brit. Jour. Chil. Dis.*, January, 1908).
6. Medical Treatment of Tubercular Peritonitis.—Bussi (*Abst. Brit. Jour. Chil. Dis.*, March, 1908).
7. Treatment of Tubercular Peritonitis with Marmorek's Serum.—Ganghofner (*Wiener Klin. Woch.*, 1909, No. 3).
8. Tubercular Peritonitis Treated by X-Rays.—Allaria and Rovere (*Arch de Med. des Enf.*, June, 1909).
9. Tubercular Appendicitis Complicating Tubercular Peritonitis.—Allan (*Brit. Jour. Chil. Dis.*, January, 1909).
10. Abdominal Tuberculosis in Great Britain and United States.—Bovaird (*Archives of Pediatrics*, June, 1909).

Wiel and Pehu have studied the interesting question of tubercular peritonitis in the nursling. Their communication includes the report of two cases and a detailed review of the literature of the subject. They have been able to collect about a hundred reported cases, and their conclusions are based upon this literature. The anatomic peculiarities of the disease in infancy are thus summed up:

(1) The caseous form is the most common—and caseous tubercles are found in most cases in the peritoneum.

(2) Concomitant tubercular lesions of the intestines themselves are very common.

(3) One characteristic feature is the presence of caseous tubercles in the genitalia, in both sexes. This is probably a contemporary infection, caused by the blood stream.

(4) It is the rule to find diffuse tubercular infiltrations in other organs, notably in the viscera.

Tubercular peritonitis in the nursling is thus characterized by the manifest predominance of caseous lesions, by the generalization of the lesions, and by the frequent coincidence of genital tuberculosis.

Clinical Symptoms and Signs: Among the more prominent clinical features are: Abdominal distention, vomiting, diarrhea and progressive emaciation. On palpation there is usually evident pain and tenderness on pressure. Widerhofer calls attention to the value of finding palpable

lymph glands in the abdomen—notably with reference to the retroperitoneal glands.

Vierordt notes that in female infants a purulent vaginal discharge is very common. In males, rectal examination shows infiltration about the prostate and seminal vesicles.

Most cases run without fever—except in the presence of complicating secondary infection.

Schroeter has shown that umbilical fistulæ in infancy are commonly the result of tubercular peritonitis. The fistula may remain open just long enough to permit the abdomen to drain—or it may be converted into a fæcal fistula as the result of inflammatory process with resulting tissue destruction.

Enlargement of the liver and spleen and of the peripheral lymph glands is frequent.

In general these infants present the picture of a pronounced and progressive athrepsia. The disease is almost always fatal, either as the result of marasmus, or of secondary infection, or of terminal meningitis. Recovery does, however, ensue in some cases, usually in the ascitic forms—which, as already noted—are comparatively rarer in infancy than in later life.

The diagnosis is often exceedingly difficult—and it to be based upon the associated signs and symptoms as above noted. The occurrence of abdominal symptoms, with the association of evident lesion of the genitalia, is to be regarded as exceedingly significant. [It would appear that in suspicious cases, a v. Pirquet or a Moro test might be of great diagnostic value.—Ed.] The treatment is practically the same as in older children. In the ascitic cases abdominal paracentesis is often of value—but laparotomy—as such—apparently offers no better outlook than purely conservative treatment.

Discussing the pathogenesis of tuberculosis in childhood, Roux and Jusseraud conclude—as a result of their experimentation and experience—that intestinal tuberculosis, either tubercular enteritis, or tubercular peritonitis, is a secondary tuberculosis due to ingestion of the bacilli (and proliferation) from the rhinopharynx. With reference to the frequency of tubercular peritonitis in childhood Stone's report is of some value. He reports 122 cases of tubercular peritonitis, 20 of which occurred in childhood. Bovaird has tabulated hospital reports in England and America, with reference to the frequency of abdominal tuberculosis. (He does not distinguish between tubercular enteritis and peritonitis, but undoubtedly the greater proportion of his cases must come in the former category.) He finds a very marked discrepancy between the figures for England and America. In England, of 47,030 hospital cases, 1,327 (3%) had abdominal tuberculosis, and 769 (1.6%) had tubercular meningitis. In America of 39,567 hospital cases, 82 (0.2 %) has abdominal tuberculosis, and 345 (0.9%) had tubercular meningitis. The figures seem to make it clear that, on the whole, tuberculosis is much less common in children in the United States than in Great Britain. The great discrepancy between the relative increase of abdominal tuberculosis in children in the two countries is also very striking.

With reference to the question of treatment of tubercular peritonitis in childhood, some interesting figures have recently been published.

Schmid has studied some cases, with special reference to the permanent results of operative and conservative treatment. He tabulates 41 cases of tubercular peritonitis in childhood.

There were 19 laparotomies of these:

11—57.8% remained well 3 years or over.
1— remained well less than two years.
1— unknown.
6—31.6% died.

There were 22 cases conservatively treated. Of these:

12—54.6% recovered permanently.
1— remained well less than two years.
1— unknown.
8—34.6% died.

Eleven of the operated, and 8 of the non-operated cases were in the prognostically good category of tubercular peritonitis. But the non-operative group had more cases of the severest type than did the operative group. No conclusions are drawn by the author, as to the definite advisability of operation. In a discussion, before the British Society for the Study of Disease in Children, as to the general prognosis of the disease, Carpenter reported 31 cases which he had seen and followed. Of these, 15 died, 10 recovered permanently and 6 were not definitely traced. Full details not given. Still called attention to the constant danger of implication of other organs in cases of fatal abdominal tuberculosis. The lungs are the most likely of all organs to be attacked. The infection in such cases probably occurs via the thoracic duct and the pulmonary artery.

Sutherland, discussing treatment, insisted on the value of open air treatment and rational diet. The part of drug treatment in this disease is very small. This is indeed the general consensus of opinion among even the warmest advocates of conservative treatment at the present time.

Bussi, who is a strong adherent of conservative treatment, advocates simple tapping of the abdomen, when there is acites. He then paints the abdomen with an iodine guaiacol mixture, supplementing this by the subcutaneous injection of a solution of iodine 1 part, potassium iodide 10 parts, guaiacol 20 parts and glycerin 80 parts. In some cases he has given this mixture by mouth with very satisfactory results. He believes that iodine is of very great value in the treatment of this condition.

Ganghofner reports the result of his treatment of various forms of tuberculosis in childhood with Marmorek's serum. There were 32 cases in all, including 5 cases of tubercular peritonitis. No results were obtained in any of the cases that could be attributed to the serum per se. It would appear that the antitoxins could not be absorbed from the bowel in quantities sufficient to do any good. This is in accord with the experience of many other investigators. Allaria and Rovere treated severe cases of tubercular peritonitis in childhood with the *x*-rays. Fifteen minute treatments were given, repeated at daily or several day intervals. The authors are unwilling to claim any positive results from the treatment. Apparently this form of treatment should be reserved for the ascitic cases. [But it will be remembered that the ascitic cases offer the best outlook under any rational form of treatment.——Ed.] Even in these cases it would appear difficult to say how much of the derived benefit was due specifically to the action of the rays. The treatment must still be regarded as absolutely experimental and is by no means to be recommended as routine procedure. Allan reports that in tubercular peritonitis in childhood tubercular appendicitis is not an uncommon complication. The treatment is necessarily operative, but the prognosis is generally very unfavorable.

TREATMENT OF RHEUMATISM.

A REVIEW OF RECENT LITERATURE.

By William Engelbach, M. D.

1. The Treatment of Acute Articular Rheumatism.—Plehn (*Deut. med. Woch.*, 1908, LI., 2201).
2. The Effective Treatment of Acute and Subacute Rheumatism.—Lees (*Brit. Med. Jour.*, 1909, I., 146).
3. Spirosal Treatment of Rheumatism.—Gardemin (*Deut. med. Woch.*, 1907, No. 69).
4. (Ibid.)—Perl (*Med. Klin.*, 1908, No. 15).
5. (Ibid.)—Schonheim (*Budapesti Orvosi Ujsag*, 1907, No. 27).
6. (Ibid.)—Ruhemann (*Berl. Klin. Woch.*, 1908, No. 23).
7. (Ibid.)—Dengel (*Alig. Med. Centr. Ztg.*, 1908, No. 18).
8. Thyroid Medical in Chronic Arthritis.—Leopold Levi and Rothschild (*Bull. de l'Arcad. de Med.*, 1908, No. 10).

Plehn says that the success of the salicylate treatment of acute articular rheumatism depends on sufficient dosage. When so given, he thinks the action of the salicylic acid is as specific as the action of quinine in malaria or of mercury in syphilis. He gives one gram every two hours, so that the patient takes 6 grammes a day, suspending the medication at night. This is continued until the temperature has been normal for three days and all joint symptoms have disappeared. He then gives 4 grammes a day for a week. Three further days in bed without drugs are insisted upon before the patient is allowed to get up. The painful joints are dressed with dry cotton and supported on cushions. This method is applied to every case, no matter how mild it may seem, and he regards it as the minimum dosage necessary for the proper treatment. Women, as a rule, do not tolerate such doses, and he consequently reduces the dosage to 5 or even 3 grammes a day. As a rule, the dosage should correspond to 0.08 gram per kilogram of body weight. In 319 cases so treated, with the heart normal, valvular trouble developed in only two cases, and in these this method had not been carried out strictly. In 101 recurring cases of rheumatism, in which the first attack had been treated elsewhere, heart trouble developed in 36 cases. Plehn is convinced that this method of early, vigorous, and long-continued salicylate treatment saves the patient from complications on the part of the heart and pleura. He believes that salicylic acid in doses of 8 grammes a day, continues for long periods of time, has no toxic effect upon the heart. It can be given without bad results in chronic valvular disease and myocarditis. He says that existing acute or chronic nephritis was always favorably influenced by its treatment. He believes that baths and packs reinforce the action of the drugs, but never take their place. He suggests for the rare cases which resist the salicylate treatment either the intramuscular injection of quinine with antipyrin or the intravenous injection of colloidal silver.

Lees believes that rheumatic fever is a specific infectious disease, the manifestations of which differ widely in children and adults. He believes that in childhood the heart is always affected to a greater or less degree, but that the joints may be only slightly and often not at all affected. When it attacks adults, the most prominent manifestation is an arthritis. He attributes to the salicylates a specific action against the rheumatic microbe or poison. For this purpose the salicylates must be given in sufficiently large doses. He believes that practitioners are satisfied ordinarily with the cure of the more easily controlled manifestations,—the arthritis and the pyrexia. He deprecates this attitude and speaks for the more energetic use of the salicylates to ward off cardiac complications. The addition of double the amount of sodium bicarbonate to each dose of the salicylate will help to prevent the unpleasant symptoms which may prevent the use of a sufficient amount of sodium salicylate. The initial dose for an adult should be 15 grains given every two hours, from 6 a. m. to 10 p. m., or 150 grains daily. A child aged from seven to twelve years should receive 10 grains every two hours, or 100 grains daily; for a child younger than seven, 5 grains at a single dose, or 50 grains a day. The amount of the daily dosage should be increased each day, or every second day, until unpleasant symptoms are produced. These are deafness, tinnitus, vertigo, vomiting, etc. Drowsiness in children, an acetone odor to the breath, or acetonuria, with slowing and deepening of the respirations, are danger symptoms. He points out that these symptoms may be entirely prevented by the relief of constipation and the use of sufficient sodium bicarbonate. The daily increase of the dosage may be from 2 to 5 grains in the individual dose. The amount needed for a child may be nearly as great as for an adult, for in a child the infection is more virulent and more often affects the endocardium. In a child, also, the drug is eliminated more quickly in the urine. In mildly acute and subacute cases a daily dose of 150 grains may be sufficient, but in many it is necessary to increase this to 200 and 250 grains a day, and in some severe cases to 350 and 400 grains. Chorea may require 250 to 400 grains daily.

Spirosal has recently been warmly recommended as an improvement on mesotan and other salicyl preparations for local applications. It is a thick fluid, without odor or color, soluble in alcohol. As Impens has pointed out, the drug is soluble in oils to the extent of about 17.9 per cent., or 20 per cent. if mixed with equal parts of rectified spirits. This solubility in oil enables it to penetrate the skin readily, while at the same time it is, of all the salicyl esters, the one which is most soluble in water; hence it not only penetrates the skin readily, but also is able to pass quickly into the blood and lymph. This is borne out by the evidence of Gardemin, who found that the urine gave the salicyl reaction within two and one-half hours of applying the drug to the skin. Other observers obtained the reaction in three hours, and Perl states that the reaction persists for ten to thirteen hours. Perl, Schonheim, Ruhemann, and Dengel all agree that the drug is not irritating to the skin, or followed by gastric irritation or ringing in the ears. Gardemin, out of fifteen cases, only noted two instances of cutaneous irritation with reddening of the skin and slight pain. Ruhemann, in one case, after the energetic application of several drachms, observed transient giddiness. The therapeutic effect of the drug is very marked in acute muscular rheumatism and in the acute exacerbations of chronic joint rheumatism, while it also proved useful in acute rheumatism and in gout.

Leopold Levi and Rothschild report favorably of the use of thyroid medication in thirty-seven cases of chronic rheumatism. The cases were observed for three years, and varied in the age from twelve to sixty-five years. Ten of the cases were chronic deforming rheumatism, and five had been bedridden for years. In nine cases there was a history of subacute exacerbations, ankylosis, deformity, and persistent pain. Of these, fourteen improved considerably as regards pain, use of joints, deformity, and articular deviation, while two were completely cured. The twenty other cases were instances of medium or more benign types of rheumatism, and eighteen of these were improved or cured. The results were most favorable in cases where the joint changes were not profound, where the lesions were restricted, the patients young, and the onset of the disease recent. The dose was one to three cachets daily, containing 1½ gr. of dried thyroid powder, equivalent to 7½ gr. of the fresh gland.

THE DIGESTION AND ASSIMILATION OF FATS.

A REVIEW OF RECENT LITERATURE.

By Jesse S. Myer, M. D.

1. The Digestion of Fats in the Animal Organism.—Levites (*Zeitschrift f. physiol. Chem.*, Bd. XLIX.-LIII.-LVII.).
2. The Extraction of Pancreatic Secretion from the Stomach.—Lewinski (*Deutsche Med. Wochn.*, September 10, 1908).
3. Diagnostic and Experimental Orservations Concerning Fat Digestion in the Gastro-Intestinal Tract.—Umber (*Münch. Med Wochn.*, No. 31, 1906).
4. Experiments on the Absorption of Fat from an Isolated Loop of Small Intestine in Healthy Dogs.—Plant (*The Am. Journ. of Physiology*, Vol. XXIII., No. 21, 1908).
5. Alimentary Lipaemia.—Leva (*Berliner klin. Wochn.*, 1909, No. 21).
6. Fat Splitting Ferment in the Lymphocytes.—Bergel (*Münch. med. Wochn.*, January 12, 1909).

Considerable work has been done of late on the rather obscure subject of fat digestion. Many of these observations have been made upon animals and, perhaps, an equal number upon the human. These investigations have resulted in several interesting and, no doubt, useful facts. Levites working with dogs with stomach fistulæ comes to the following conclusions, in regard to the digestion and absorption of three fats, namely beef fat, butter and lard,—that in comparison with proteids and carbohydrates, fats remain quite long in the stomach,—that in the first hour of digestion fats pass very slowly and irregularly into the duodenum, but with increasing rapidity after this time. Beef fat remains a much less time in the stomach than the other two, and none of these fats are absorbed in the stomach. The absorption begins in the jejunum, and is practically ended at the cecum. Neutral fat cannot be absorbed except after splitting into fatty acid or its compounds, and the facility with which this is done depends much upon whether the fat is given in a finely divided state or not. The chemical change, in the stomach, is very slight in the first hours, when the acidity is high, but later when secretion ceases, and probably a regurgitation from the duodenum takes place the fat splitting is considerable. The author does not, therefore, agree with Vollhard and his pupils that there is a fat splitting ferment manufactured by the stomach, but believes that the fat digestion which takes place here is due to regurgitation of ferments from the small intestine. The work of Lewinski seems to add weight to the view of Levites on this point. By giving a patient 150 grams of olive oil and preventing the stomach from becoming more than slightly acid by means of magnesia usta, removing the stomach contents through a stomach tube after an hour, he was able to demonstrate the presence of trypsin in every case. He asserts moreover that the absence of trypsin in the stomach

contents after such procedure shows either pancreatic insufficiency or pyloric obstruction.

Umber makes the following statements: When the fat in the stool is as much as 45 per cent. of that ingested it speaks for simple shutting off of the bile. When more than 60 per cent. is found there is also interference with the pancreatic function. If more than 50 per cent. of fat escapes from a non-icteric patient there is probably pancreatic disturbance. When neither bile nor pancreatic juice reaches the intestine as much as 87 per cent. of fat is lost. There must be other fat splitting enzymes besides the one in the pancreatic juice. Although the fat absorption, which depends on the pancreas may be strongly altered, the fat splitting is not greatly affected until many parts of the digestive canal are diseased. The work of Plant partly substantiates and partly refutes the conclusions of Umber. This author, working on healthy dogs, isolated a piece of the small intestine measuring 55 to 75 cm. in length, beginning about 25 cm. below the pylorus, separating this loop from the rest of the intestine without interfering with its blood supply or mesenteric attachment. He sums up his work as follows: Bile salts greatly increase the absorption of fats from a mixture that contains free fatty acids or soap. They only slightly increase the absorption of neutral oil. Solutions of soap in the absence of other fat are absorbed from a loop of intestine in greater percentage than emulsified fats. This is also true of fatty acids dissolved by salts. Neutral oil can be absorbed without action of either bile or pancreatic juice from a loop of intestine, where both these secretions are excluded. Under such conditions the neutral oil becomes markedly acid in reaction.

Leva has recently tried by a more simple and shorter method to verify the results of Neisser and Braeuning, in regard to the fat content of the blood serum following the ingestion of fat. Leva, following the methods of Neumann, used the dark field mirror condensor with a moist fresh specimen of blood under a cover slip. Neumann has called attention to the fact that Hämoconien, or "blood dust," described by Müller, was composed of fat and varied in size from those visible with the ordinary illumination to the very smallest just visible with the dark field illumination, that these bodies were not present in the blood of individuals on a fat free diet, and that their time of appearance and number depend largely upon the ingestion of fat. Leva has verified these statements and added a few observations of his own. The larger the amount of fat ingested the sooner do the Hämoconien appear, the larger their number and the greater the number of large forms. The Hämoconien make their appearance about one hour after a full meal and only after 15 or 16 hours do they finally disappear. Their appearance in the blood is delayed in cases of poor stomach motility or pyloric stenosis. The absorbability of the rectum for oil was tested by this method. 200 ccm. of olive oil were injected and showed practically no increase in the Hämoconien. 250 grams of cream with five grams of pancreatin showed only a few Hämoconien, not nearly the amount caused by 5 grams of butter taken per os. Leva says that the manner in which the blood disposes of or digests the Hämoconien is yet to be settled. Strauss found lypolitic substances in the blood serum. Braeuning, on the contrary, could not demonstrate them. The recent work of Bergel may throw some light upon this question. He claims to have found a fat splitting ferment in the lymphocytes. If further investigation proves the correctness of this it will give added interest to the question of fat metabolism.

NEW METHODS IN HEMATOLOGY.

A SURVEY OF RECENT LITERATURE.

By Albert E. Taussig, M. D.

1. A Satisfactory Method for Staining Blood Smears.—Hayhurst (*Jour. A. M. A.*, April 3, 1909, No. 14).
2. Clinical Observations on Blood Stains.—Peebles and Harlow (*Jour. A. M. A.*, March 6, 1909, No. 10).
3. The Examination of Human Blood Stained with a Hypotonic Solution of Methylene Blue.—Sebrazès (*Lav. e Riv. di Chim. e Micr. Clin.*, Vol. I., No. 5).
4. Granulated Red Blood Corpuscles.—Fiessinger and Abrami (*Rev. de Méd.*, 1909, No. 1).
5. A Simple Method for Finding Blood in Urine.—Albarran and Heitz-Boyer (*Presse Méd.*, May 19, 1909, No. 40).
6. Blood Test by Means of the Turpentine-Guaiac Method.—Dreyer (*Muench. med. Wochenschr.*, July 6, 1909, No. 27).
7. A Skin Reaction in Carcinoma.—Elsberg (*Jour. A. M. A.*, March 27, 1909, No. 13).
8. Demonstration of the Trichinella Spiralis in the Circulating Blood in Man.—Herrick and Janeway (*Arch. Int. Med.*, April, 1909).

Blood Stains. In staining blood-films the various solutions of eosinate of methylene blue in methyl alcohol (Jenner's stain, Wright's, Tiedemann's, Harlow's, etc.) are so convenient, that for routine work they have displaced all others. One of the most useful of these is Harlow's stain, or Skelton's, as it is sometimes called. "This stain is of two parts, one a 1 per cent. solution of eosin, water soluble, in methyl alcohol, and the other a 1 per cent. solution of methylene blue in methyl alcohol. The smear is stained first for one minute with the eosin mixture and the stain poured or thrown off. Then the methylene blue solution is put on for one minute, after which it is washed in distilled water, dried and mounted as usual. In the Harlow stain the methylene blue is polychromed on the smear by the little eosin remaining on the glass, after most of it has been poured or thrown off. The stained smear has the same general appearance as the Wright stain, except that the reds have somewhat of a blue tint." Hayhurst has found that constantly good results can best be obtained by this method, if care is taken that little or none of the methyl alcohol evaporates during the process of staining. He uses three Syracuse flat-bottomed watch glasses, which may be piled one on the other. The eosin solution is poured into the bottom glass, upon this is placed a second one containing the methylene blue while the third one, empty, is placed on top as a cover. The dried spread is placed, face downward, into the eosin solution and the others put on top. After a minute it is taken out, the stain flicked off, and placed into the second glass and again covered. After another minute it is again removed, washed, dried and mounted.

Peebles and Harlow call attention to the instability, under ordinary

circumstances, of all of the methyl alcohol stains. This is due to the fact that methyl alcohol is of itself unstable. "In the presence of but little light or air, it is in part changed to formaldehyd, and this, with a bit of moisture is converted into formic acid. It makes some difference what methyl alcohol one uses. The 'absolute methyl alcohol, acetone-free,' is not so good for making up a staining solution as is the 'reagent methyl alcohol' to be had from Merck. Absolute methyl alcohol readily changes in part to formaldehyd and formic acid, even in the absence of any amount of light, air or moisture; whereas the 'reagent' alcohol is far more stable.

It has been the ordinary experience of every one who has had much blood work to do, that an old stain always stains too red; this, for the reason pointed out above, that the old staining mixture becomes acid. In the presence of a trace of acid the oxyphilic component of the stain is accentuated, while the avidity of the methylene blue is depressed and *vice versa*. Again, different bloods react differently to the same staining fluid under the very same technic. A normal blood, for instance, will stain very well with a certain staining solution, while a smear from pernicious anemia will not stain at all well, or it may be impossible to demonstrate the granules of the myelocytes in a case of myelogenous leukemia."

Good results can always be obtained if the proper reaction is produced by the addition, if necessary, of glacial acetic acid or of an alcoholic solution of potassium hydrate. In old stains the latter will usually be needed. Where the two stains are used separately, as in Harlow's method, the reaction of the methylene blue alone will have to be corrected. This reaction of the solutions is apparently of far greater importance in determining the red or blue color of the spread than is the relative proportion of eosin or methylene blue used. The decomposition of the alcohol can be prevented by keeping it in bottles rendered opaque by a coating of asphalt black. The ordinary dark brown bottles, in the writer's own experience, do not suffice to render their contents stable.

The so-called vital staining of blood-films is attracting much attention. A number of methods have been suggested, of which that of Sabrazès is typical. A small drop of blood is spread evenly, in the usual manner, upon a slide carefully cleaned with alcohol and ether. A small drop of a dilute solution (1 to 500) of methylene blue, medicinal pure, is placed upon a clean cover glass, which is then inverted upon the evenest portion of the blood spread. The latter, it will be seen, is not fixed. The stain spreads out promptly between slide and cover and the specimen is ready for examination with the oil immersion. The red corpuscles are barely stained, but stand out with clear outlines. The white cells, both lymphocytes and polynuclears, are readily recognizable. The neutrophil granules take a faint bluish tinge, the eosinophils are greenish and the mast-cell granules have a violet tinge, the nuclei of all these cells staining a more definite blue. Malarial parasites are readily recognized and so are the characteristic cells of leukemia. The blood platelets stain intensely and can readily be counted.

The most interesting features of blood stained in this manner are, however, the granulated erythrocytes (*hématies granuleuses*). These are red corpuscles that with ordinary stains show no abnormality but, by this method, are shown to contain tiny granules often connected by a fine net-work. They are sometimes found free in the blood and are then bound together by basophilic strands into a delicate reticulum. Normal blood contains a moderate number of these granulated cells, but in the anemias, and in certain intoxications, they are very abundant. Whether these

granules represent regenerative or degenerative changes is not yet clear. They seem to differ essentially from the granules in the so-called "stipple cells." The writer of this abstract has seen a number of cases, that clinically presented the picture of anemia, with a moderate reduction of hemoglobin, in which the stained blood, after fixation, showed no abnormality, but in which spreads treated by this method were found to be full of red cells with basophil granulations. The method can be recommended as a simple and satisfactory one for routine office work. Its disadvantages are that the spread must be stained before it is more than a few hours old, and that it must be examined before the film of stain dries out.

Fiessinger and Abrami have obtained similar results with Pappenheim's reagent (pyronin and methylene green), Unna's polychrome methylene blue diluted four times or a mixture of methylene azur solution with ten times its volume of physiologic salt solution.

Blood Tests. The usual tests for blood in urine are reasonably satisfactory, but Albarran and Heitz-Boyer believe that the following method offers definite advantages. The reagent is a decolorized alkaline solution of phenolphthalein. Two grams of phenolphthalein and 20 of potassium carbonate are dissolved in 100 c.c. distilled water. Ten grams of powdered zinc are added and the mixture boiled, with constant shaking, until the fluid, at first red, is decolorized. It is then filtered and keeps for a long time in a well-stoppered bottle. In making the test two parts of urine are mixed with one of the reagent, and a few drops of hydrogen peroxide are added. If blood be present the urine turns bright red, the blood enabling the peroxide to re-oxidize the phenolphthalein which had been reduced by the zinc. The intensity of the red and the rapidity with which it appears indicate roughly the amount of blood present. The test is a delicate one, being positive if blood is present in the proportion of 1 to 100,000 of urine, that is in amounts in which the detection of red blood corpuscles by the microscope might be difficult. The reaction is said not to be influenced by the acidity or alkalinity of the urine, by the presence of pus, albumen, sugar, acetone, indican, bile, urates, chloroform, thymol, etc., nor by any drugs. In this respect it is apparently superior to the guaiac tests.

Dreyer describes a modification of the guaiac test for blood which seems to be superior in some ways to the methods hitherto described. The stool or the stomach contents are treated in the usual manner with seven cubic centimeters of ether and a little glacial acetic acid. To the ethereal extract a little powdered guaiac is added, as recommended by Boas. The mixture is then poured over a piece of white filter paper that has been dipped into ozonized oil of turpentine. If blood be present a blue color results immediately; if much blood be present, in 10 or 15 minutes in the presence of the faintest detectable traces. One advantage of the method is that the different portions of the ether are mixed with the powdered guaiac in different proportions. While some drops of the extract, as it is poured over the turpentine paper, will contain too much or too little guaiac to make the test of the greatest possible delicacy, others will contain the most advantageous possible proportion. It is for this reason that the blue color, in the presence of very faint traces of blood, will appear only at isolated spots on the paper. Care must be taken that the fingers are allowed to touch neither the reagents nor that part of the filter paper that is to be saturated with turpentine, since traces of sweat will of themselves give a positive reaction.

Carcinoma. Numerous investigators have shown that if the blood serum of a patient suffering from carcinoma be mixed with normal human

red blood cells, hemolysis occurs. The reaction takes place in from 50 to 80 per cent. of cases of malignant disease. It occurred to Elsberg that if washed red blood corpuscles from a healthy human being were injected under the skin of a cancer patient hemolysis might take place there as well as in the test tube, and a local reaction be produced. He found that the hypodermic injection of laked blood always produced a local inflammatory reaction, whereas the injection of uninjured red corpuscles ordinarily did not. Patients whose serum had hemolytic power might be expected to lake the red corpuscles after their injection. An inflammatory reaction would thus result. "The technic employed was a very simple one. Under aseptic precautions, and with a syringe boiled in 0.85 per cent. salt solution, blood was aspirated from the median basilic vein of a normal individual (preferably a child), every possible precaution being taken to ascertain that the individual was healthy and free from hereditary or acquired disease. The blood was defibrinated and the cells washed four times in normal saline solution, care being taken that the washings and centrifugating was thoroughly done. A 20 per cent. emulsion of the red cells in normal saline solution was made and kept in the ice-box for twenty-four to forty-eight hours before it was used. Five minims of this twenty-four to forty-eight-hour old suspension of washed red blood cells were subcutaneously injected into the anterior surface of the forearm of the patient by means of a hypodermic syringe sterilized in normal salt solution. In the patients in whom a 'reaction' was obtained the following changes were noted in the skin at the site of the injection: Three to twelve hours after the injection the affected area was slightly raised and slightly tender; it had a more or less well-defined margin; it measured 2 to 4 centimeters, and it was of a somewhat dusky red color. The changes in the skin reached their maximum within one to two hours, and the red area then began to fade, rapidly or slowly. Eight to twenty-four hours after the injection the skin lesion had either entirely disappeared, or, more often, a brownish, bluish or lemon-yellow discoloration remained, which persisted for a number of days.

"In the patients who did not show this reaction there was either nothing to be seen at the site of the injection excepting the needle puncture, or a brownish discoloration of the skin, or a bluish discoloration, as is often seen after a hypodermic injection."

The test was tried with 20 cases of cancer, all of whom reacted positively. Of four cases of sarcoma, three reacted positively. In over 100 non-cancerous individuals, all but three failed to react. If further experience with this method confirms Elsberg's results, a new and valuable diagnostic method will be at our disposal.

Trichinosis. It has long been known, from animal experiment, that in trichinosis the embyros enter not only the lymphatic spaces, but also the blood current. Hitherto, however, they have not been found in the circulating blood in man. Recently, however, Herrick and Janeway have found the parasite in the blood in a case of human trichiniasis. The blood was obtained by means of a syringe, from a vein at the bend of the elbow, was laked by means of 3 per cent. acetic acid, centrifugated and the sediment examined for embryos. In three cases of trichiniasis they failed to find the parasites in two, but found them readily in the third. It would seem, then, that a negative result has no definite significance, whereas the finding of the embryos settles the diagnosis. At all events a blood examination should precede the much more serious procedure of excising or harpooning a piece of muscle for microscopic examination.

BISMUTH EMULSIONS.

A REVIEW OF THEIR TOXICITY FROM A RADIOGRAPHIC AND THERAPEUTIC STANDPOINT.

By Edward Holman Skinner, M. D., Kansas City, Mo.

1. Electro-Therapeutics and the Roentgen Rays.—Kassabian.
2. Roentgenography in Diseases of Stomach and Intestines.—Hulst (*Fan. Am. Roentgen Ray Society,* 1908).
3. Die radiologische Diagnostik der intra- und extraventrikulæren Tumeren.—Monograph by G. Holzknecht and Jonas, 1908.
4. A Study of Constipation by Means of the X-Rays.—Hertz (*Archives of Rocntgen Ray,* June, 1908).
5. Roentgen Ray Examination of Digestive Tract.—Groedel (*Archives of the Roentgen Ray,* October, 1907).
6. Toxic Effects from Bismuth Subnitrate.—Emil G. Beck (*J. A. M. A.,* Vol. LII., No. 1).
7. Bismuth Poisoning.—David and Kauffman (*J. A. M. A.,* Vol. LII., No. 13.
8. Diagnosis of Oesophageal Stricture.—Pirie (*Archives of Roentgen Ray,* July, 1908).
9. Pancoast (*U. of P. Bulletin,* August, 1906).
10. Bismuth Poisoning and a Harmless Substitute for Bismuth in X-Ray Work.—Lewin (*Münch. med. Wochensch.,* March 30, 1909).

The more general use of bismuth emulsions for radiologic and therapeutic purposes, and the report of a few complications following the use of the bismuth subnitrate salt, has aroused an unwarranted amount of discussion by those in the profession unfamiliar with its use. A study of the literature has brought forth much of interest.

The use of bismuth subnitrate, either mixed with food or suspended in water or in capsules, was introduced by Roux and Balthozard in 1896. (Kassabian). They used over an ounce to the pint of emulsion. Pancoast reports on 40 cases where two ounces of bismuth subnitrate to the pint of acacia mixture was used. The bulk varied from 6 to 32 ounces. In many of his cases as much as four ounces of the subnitrate was used without any unpleasant results. However, six cases showed toxic symptoms after this amount had not been removed after its use, radiographically. Sailer, at the same time, reported symptoms following the use of the subnitrate, with cyanosis, dyspnœa, nausea, etc. He excluded antimony and arsenical decomposition of the subnitrate. He thought that the *x*-ray peculiarly affected the trypsin, causing a disintegration of the subnitrate. Hulst administered one ounce of the subnitrate in over 30 cases without any ill effects. Holzknecht administered the subnitrate in several hundred cases as a basis for his exhaustive articles on stomach and intestinal physiology and a study of pathological conditions in the

alimentary tract, and there is the absolute absence of any notation regarding any deleterious effects of subnitrate of bismuth.

Groedel, in a discussion of the propriety of the use of bismuth subnitrate, cites the large doses given by Rieder and Holzknecht and the Russman treatment of gastric ulcer in which from 10 to 20 grams of the subnitrate were given daily. Groedel has never met with any bad results in his practice. He believes that the vomiting can usually be attributed to some independent accidental cause. He asserts that the bismuth remains unaltered by the acid gastric juice or by the alkaline intestinal secretions; that the bismuth passes into the fæces mostly unaltered excepting that some of the crystals are coated with black oxide of bismuth. It may be doubted if the bismuth is entirely inocuous to children, to whom in all events, it should be given in minimal doses.

Beck has reviewed the reports of toxic effects from bismuth subnitrate, where it has been used in salves for applications to burns and wounds and also for radiologic and therapeutic injection. Several reports of poisoning from its application to wounds are interesting but the toxic effects immediately receded upon curettement and cleansing of the wound.

Beck repeats that the large daily doses of bismuth administered by Muhlig and Russman, without toxicity, made the use of large amounts for radiologic and therapeutic purposes justifiable. The first reports of toxicity in this field were by Worden and Pancoast and in these two cases in which 60 and 120 grams had been used and bismuth poisoning resulted, there was complete recovery in both. Bennecke and Hoffman reported the first fatal case of an infant, three weeks old, suffering from enteritis, where 3 grams were used to diagnose a pyloric stenosis. In 12 hours there was cyanosis and 3 hours later the infant died. Methemoglobinemia was present, and bismuth was found in the liver and bowels and in the blood. Boehme reports one fatal case in a child that suggested death by nitrite poisoning. Experiments proved this to be the fact. Altogether five cases of nitrite poisoning have been reported with two deaths. It is likely that the bismuth subnitrate ingested, always causes a liberation of small quantities of the nitrites, which are either absorbed and, owing to the small amount, cause no toxic symptoms, or changed in the intestine into ammonia or nitrogen. Reasoning further on this basis, there would be more nitrites liberated, the more subnitrates administered. Alcohols and glycerins seem to accelerate the formation of nitrites, therefore they should not be exhibited during the administration of the subnitrite. Beck states further that the liberation of the nitrites from bacterial action is more noticeable in the large intestine, and further that in the fatal cases thus far reported, all have suffered with some intestinal disturbance, which might have been potent in promoting putrefactive changes and more rapid bacterial action on the subnitrate. Beck makes a preliminary report on his extensive use of the bismuth paste for injection of sinuses and states that there is possible an absorption of the paste, the exact manner of which has not been successfully determined. Beck has never had a case display toxic symptoms similar to nitrite poisoning. Some of his cases have had a slight lividity of the mucous membranes and skin and a bluish border at the margin of the gums, with ulceration of the mouth in one case. These toxic symptoms have all been relieved upon the withdrawal of the emulsion from the sinus by means of a suction pump and a flushing with olive oil. Beck records at length one case that did not present typical symptoms of nitrite poisoning, but there was the presence of metallic

bismuth in the tissues without any indication of severe destructive changes however. It is doubtful if this case can be recorded as a death from bismuth poisoning, as the interstitial nephritis which had been present for some years and an abscess formation at the wrist, would more clearly point to the cause of death. The renal tissue was free from deposition of bismuth. Beck concludes as follows: 1. Bismuth subnitrate administered by the stomach in small doses is harmless. 2. In the presence of certain bacteria, or the fæces of children, bismuth subnitrate will liberate the nitrites, which will be absorbed by the intestines and eliminated by the kidneys; and, if the production is faster than the elimination, methamoglobinemia will result. 3. In larger doses per os, bismuth subnitrate is liable to produce an acute nitrite poisoning, characterized by the cyanosis, collapse, methamoglobinemia, and may terminate fatally. 4. Rectal injections of bismuth subnitrate may cause nitrite poisoning much quicker and more severe than when exhibited per os. 5. Children are more susceptible. 6. Persons suffering from intestinal putrefaction are more susceptible. 7. After the injection of large quantities of bismuth paste into suppurating sinuses, mild symptoms of nitrite poisoning may appear. 8. The bismuth injected into these sinuses and encapsulated will be gradually absorbed and may be found in the liver, spleen and intestines. 9. Characteristic symptoms of black borders of the gums, ulcerations of mucous membranes, diarrhea, desquamation nephritis, may appear several weeks following the injection of the paste. 10. The acute nitrite poisoning is to be regarded as a distinctly separate affection from the more chronic bismuth absorption. 11. Radiographers should employ some other preparation of bismuth, instead of the nitrate, and refrain from injections of subnitrate into the bowels, especially if intestinal putrefaction is present.

David and Kaufman report on two cases of poisoning from bismuth subnitrate, where it had been used as a paste for injection. Neither of the cases presented nitrite symptoms, the toxic effects being attributed entirely to the bismuth constituent. The pathological report is not attached to the report, without which there is little of interest to report.

Hertz, in an endeavor to find a substitute for the subnitrate, experimented with the subcarbonate, but found that when the subcarbonate came in contact with the gastric juice there was a liberation of free HNO_2 in the formation of bismuth oxychloride. Hence there was no alteration of the acidity of the gastric juice when small amounts of the subcarbonate were exhibited. When a large amount of the subcarbonate is used there is a reversal of this condition and the HCl is neutralized, thus failing to afford a study of the emptying rate of the stomach. He therefore now uses bismuth oxychloride. This salt is inert in the stomach and is not influenced in the intestines. There is no constipation following its use.

Lewin, in an endeavor to discard the bismuth salts, has experimented with various opaque substances. He has found that the oxide of iron in a mixture of chocolate or potatoes, produces no ill effects. He also claims to obtain better radiographic negatives with the oxide of iron.

CORRESPONDENCE.

PARIS LETTER.

By Auguste A. Housquains, M. D.

THE RHYTHM OF DIURESIS AND ITS COMPLICATIONS IN HEPATIC DISEASE.

With the healthy subject, ingesting daily a fixed quantity of liquids, the elimination of urine is quite a uniform matter; nevertheless, at times, elimination is subject to variations which, moreover, may be somewhat accentuated. These variations manifest themselves in clearly outlined oscillations, perfectly visible on the curve of normal diuresis. The results made public by authors who have thoroughly studied this question, furnish data that are remarkably unvarying. Professor Roger, who is familiar with this question, remarks that we should recognize in these physiological oscillations, a particular case of the general law that no movement in nature is uniform; that all phenomena which declare themselves unroll according to a more or less regular, oscillatory curve. Nutrition submits to this law, and urinary secretion which is intimately connected with it necessarily presents a series of modifications in keeping with the variations constantly resulting from the activity brought about by nutritive changes.

The rhythm in diuresis is disturbed in the course of various pathological conditions, notably in renal cardio-vascular affections, nervous affections, and in the disturbances of medicamental origin. Suffice it to say that the necessity of studying the daily curve in diuresis cannot be gainsaid.

Professor Gilbert and his pupil, M. Lippmann, are specially interested in finding out what are the disturbances in diuresis in subjects affected with hepatic derangements. "The rhythmic movement in urinary elimination," according to them, "is frequently disturbed and even completely obliterated in a large number of cases of hepatic disease. This results from two conditions which are directly opposite. At times the very manifest exaggeration in the oscillations of the urinary curve gives to the latter an irregular appearance, fantastic and truly ataxic; and, on the other hand, all undulatory movement may disappear, due to a daily decrease in the urinary elimination,—a decrease remarkably fixed; whereupon the tracings show daily reductions in the curve until a straight line is evolved.

MM. Gilbert and Lippmann have named the exaggerations in the daily variations in the urinary elimination "anisuria." Since 1906, when their first observations were made, they have added many others which are effecting a deeper study of anisuria. Let us say at once that as a result of the study of this non-equilibrium in diuresis, a new phase has become apparent—namely, the uniformity and fixity of the urinary decrease,

for which the same authors have proposed the name "isuria." Isuria and anisuria are therefore the two primordial disturbances that one may observe in the daily rhythm of diuresis.

What are the principal modalities? What is the semiological value of anisuria? Instead of the short and alternating oscillations characteristic of the normal curve in urinary elimination, the anisurical tracings show as broken lines, indicating daily digressions, abrupt and considerable. In certain subjects one may see the rate of increase in diuresis pass from 1,000 grms. to 3,500 grms. and then re-descend at once to 1,500 grms. before making a fresh ascension to 4,000 grms. It can readily be seen that the observations thus collected are of value only if the causes are carefully eliminated; to achieve this, a fixed regimen for the sick, of liquids and solid food, should be invoked. The urine is collected each day at the same hour and its quantity noted. This examination should be done in a room of equable temperature.

From the numerous curves thus collected, MM. Gilbert and Lippmann have been able to evolve certain clinical types, slightly schematic, without doubt, but nevertheless characteristic, things attested by the published results of their observations. Anisuria represents the exaggeration of the oscillatory movement of the normal curve: the vertical height of the oscillations indicating a deviation from the normal quantity (1,500 grms.) and the horizontal length illustrating the duration estimated by days.

One is justified in stating that sometimes there are incessant and daily variations; sometimes variations which arrive at maximum phases, then at minimum phases, each lasting from two to three days; sometimes the variations are more extended yet, showing in the form of successive cycles, ranging each time from the highest to the lowest phase in eight, ten or fifteen days. So perfectly is this done that the various tracings thus obtained recall in a manner the thermic curve of intermittent fever of the quotidian, tertian, quartan or continuous type.

As regards the quantity of urine eliminated in the course of these diverse oscillations, anisuria may be accompanied by polyuria, either appearing with normal diuresis, or finally coexisting with oliguria, the latter being very rare. MM. Gilbert and Lippmann have observed that in those affected with cirrhosis, it is unusual to observe anisuria and oliguria at the same time. From the time diuresis diminishes in a notable fashion, not only does anisuria disappear, but the normal undulatory movements also efface themselves totally, the tracings becoming equal. Isuria now obtains. Differing from anisuria, which at times is a concomitant of polyuria, of normal diuresis and oliguria, isuria never or hardly ever occurs except in oliguria.

Anisuria and isuria are then two opposite symptoms in complete contrast. If the first represents an exaggerated and immoderate increase in the physiological disposition of the urinary curves, the second indicates so extreme an attenuation of the normal contours, that in typical cases they disappear altogether. In studying anisuria in hepatic cirrhosis, we find only rarely anisuria associated with oliguria. When the affection arrives at this period, isuria obtains, anisuria completely disappearing. In the evolution of hepatic cirrhosis, anisuria is an early symptom; it is indicative of the presence of a profound circulatory trouble engendered by a hepatic lesion. Once present it continues more or less; then two eventualities may happen: either the curve changes to the regular rhythm, or, as often happens, the general state aggravates the degree of diminished diuresis, leading little by little to oliguria and its concomitant isuria. This last symptom appears then considerably later than anisuria, and its

significance is graver; at least when it is persistent and manifests itself simultaneously with oliguria.

The examination of the watery part of the urine shows that the increase in its volume corresponds to a rapid lowering of its specific gravity. Concentration is in inverse ratio to the volume of urine. The urea and chlorides vary but little in connection with the extreme irregularities in the volume of water emitted.

By way of conclusion it should be clearly stated that the examination of the urinary curve in hepatic derangements, especially in cirrhosis, reveals then the existence of two new symptoms: anisuria and isuria. To constitute their presence is easy enough; on the contrary, what is difficult is to offer a satisfactory explanation. One should ascertain, above all, in what way the hepatic lesion affects the renal function. Degenerative renal changes of hepatic origin have often been recognized; they intervene not seldom in these special cases; but preponderance must be given to disturbances of a mechanical and circulatory kind, since we know the important place occupied in hepatic pathology by hypertension of the portal vein and, secondarily, by sub-hepatic hypotention,—disturbances which react on the gastro-intestinal tract and interfere with absorption. Hence it is relatively easy to understand the important disorders which bring about the evolution of cirrhosis in the hepatic parenchyma and their reverberation on the circulatory mechanism.

August 10.

OBITER DICTA FROM FOREIGN JOURNALS.

THE IMPORTANCE OF VISION—THE EDUCATION OF THE VISUAL SENSE.

Recently the *Revue psychologique* printed in its columns an interesting article on the sense of sight in its relation to intelligence, attention and the æsthetic sense. Statistics, according to the writer's opinion, undoubtedy show the importance of vision as a factor in the development of the intelligence. Among the backward children at Carlsruhe, Doll showed that only 33 per cent. had normal vision, whereas among the children in the other schools 69 per cent. had normal vision. Gelpke had analogous results after examining backward children at Carlsruhe; and among 570 idiotic children at the Mosbach Institute he found only 27.5 per cent. with normal sight. Here it would be well to put the question, whether a visual anomaly is the cause of backwardness, or the insufficiency in cerebral development the reason for an insufficient sensorial development? The observations, according to Glepke, would show that it is not arrest in the cerebral development that causes visual disturbances, for according to this acute observer, among idiotic children the percentage of disturbed vision was 43, among imbeciles 56, and among backward children 83. In fact, the idiots most afflicted from a cerebral standpoint show a smaller percentage of ocular disturbances than imbeciles; and imbeciles a smaller percentage than backward children. Therefore we should conclude that defective vision is an important cause of mental backwardness.

When the blind achieve an elevated degree of intelligence, it is invariably due to the education of the other senses taking the place of the absent visual sense. Often the educated blind fare better than the backward, inasmuch as the care bestowed upon them is of a personal and intimate nature, while the backward are placed in the same schools with normal children and do not receive the education to which they are entitled.

In the ordinary conditions of life, myopia does not appear to exercise any influence on the intelligence, at least in individual cases which have been examined. But the probabilities are that were we to make numerous examinations of intelligent and slightly intelligent children, of the same race and same age, and belonging to the same social status, we would arrive at conclusions that would show us that the children with the greatest intelligence are gifted with the greatest visual acuity. The intelligent child, even when he is myopic, understands how to appreciate with the greatest possible profit the things that he sees. Nevertheless, myopia is a disadvantage, an obstacle; and other things being equal, a child gifted with good visual acuity will be in a more advantageous condition for development. It may even happen that a child slightly intelligent and myopic, will experience the impossibility of surmounting the difficulties of a sensorial education; in short, his intelligence will grow darker and darker.

The education of the sight, similar to all sensorial education, is not a matter of physiology but of psychology. It is not sensorial acuity which

is improved thereby, but the perception. What one commonly calls education of the senses is in reality education by the senses. To see a light is to be conscious of it; to believe that one sees an object with all its outlines is to perceive. The education of the senses is the same as the education of perception. The senses perceive only with the help of the intelligence, which alone interprets and coördinates the information given. The permanent control which the intelligence exercises on the evidence given by the senses is the essential condition to further their education. What is necessary is to augment by proper exercise the justness and delicacy of the visual perceptions, so that their essential principles will be in accord with light and shadow, and the colors. Children should be taught exactly how to distinguish between colors and all their shades, how to recognize the intensity of illumination, the distance of objects, their form, etc. The first principles of æsthetic education are acquired in this way. The Froebel methods have precisely this object, since they develop the visual perceptions by the execution of designs in colors, folding, cutting out of colored papers, weaving by means of bands of paper, etc., etc. In habituating the child to explore space by means of sight, there is developed in him visual perception of space as well as ideas of perspective.

Each sensation has three attributes: intensity, quality and tonality. Intensity coincides with the strength of the sensation. Quality is the differential manner by which the sensorial organs register a modification. Thus sight gives the perception of diverse colors, form, extent of visible objects; hearing all the varieties of sound. Tonality coincides with pleasure or with pain. The quality of the sensation constitutes its perperception, the other as sentiment. Perception, then, when it is developed, highest degree of development two distinct phenomena: one is known as perception, the other as sentiment. Perception then, when it is developed, shows varied manifestations of knowledge and intelligence.

Sensation is therefore a primitive phenomenon, acquiring through evolution and differentiation, all the other developed psychic qualities. This can be best illustrated by the method advocated by Sergi:

Excitation—Psychic Force.

Sensation.

Intensity.

Quality.	Tonality.
Perception.	Sentiment.

The psychological principles should be recognized by all educators. We have seen what bearing, sensations have on the intellectual development. At the same time what is of the greatest importance is to remember the dangers to which sensorial education is exposed when it is premature or badly directed.